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AN EXPERIMENTAL APPROACH TO GRAMMATICAL FOCUS

by

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To the memory of my grandmother,
Clara James.

ABSTRACT

This study is an experimental investigation of the semantic notion of focus. Certain syntactic and phonological realizations of focus are discussed within the framework of current grammatical theories. An experiment was performed in order to investigate the possible focusing properties in English of passivization, dative shift, and contrastive stress.

High school subjects were presented with twenty sentences which varied systematically according to voice, dative position, and placement of contrastive stress. The subjects' task was to rank order the nouns and the verb within each sentence, first singly, then in pairs and triples, according to their importance to the meaning of the sentence.

Analyses of the data showed that voice, dative position, and contrastive stress each had a significant effect on the subjects' rankings. The results further demonstrated that front-shifting and contrastive stress are two effective focus devices. The study concludes with a discussion of some implications for grammatical theory.

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CHAPTER ONE

INTRODUCTION

The Notion of Focus

The purpose of this study is to investigate
experimentally some aspects of grammatical focus in English,
where "focus" is used as a general term, roughly equivalent
to "importance." Thus, to focus a sentence constituent is
to make it semantically prominent. The starting point of
the inquiry is a consideration of focus as it is understood
in various sketchy accounts within current theories of
transformational generative grammar (TGG).

The value of an experimental approach lies in its
ability to provide a solid data-base, which is separate from
the linguists' intuitions, and from which more objective
generalizations may be extracted. Experimental work
concerning focus can therefore play an important role, both
in evaluating existing theories and in guiding further
developments toward a unified theory of focus. However, in
order to specify the goals of an experimental study in
evaluating current theories of TGG, the relevance of such
theories for the language-user requires clarification. In
the psycholinguistic literature, TGG has sometimes been

considered to be a model of both the language product and the language process; often these two roles have been confused.

TGG as a Model of the Language Process

Hypotheses of many of the initial psycholinguistic experiments within the TGG framework were variations of the "correspondence hypothesis" (Hayes, 1970, p. 5). That is, they reflected the belief that the grammar was indeed a model of the language process. It is interesting to note that these early experiments were all concerned with the transformational component of the grammar. Greene (1972, p. 108) has suggested that this component was investigated first because the phrase structure component describes a process that is "counter to every intuition that people start with 'what they want to say' and only then generate an appropriate sentence to express it." For Greene, the phrase structure component is "most implausible" as a psychological model.

These experiments were originally regarded as highly successful. For example, Miller and McKean (1964) hypothesized that speakers produce sentences by first generating a kernel sentence and then applying transformations to it; their results were interpreted as supporting the psychological reality of kernel sentences and transformations. Recently, Baker and Prideaux (1973) have

pointed out that the Miller and McKean results cannot
reasonably be interpreted in this way. Their argument is
independent of the methodological difficulties and
foundational inadequacies for which this and other early
studies have also been criticized (for a discussion of
these, see Reid, 1972, pp. 12-18).

The early evidence, then, was questionable. Subsequent
experiments (e.g., Slobin, 1966; Perfetti, 1969), which
sought to extend the original encouraging results, met with
less "success." As a result, the correspondence hypothesis
lost some of its early popularity.

TGG as a Model of the Language Product

The psycholinguistic experiments, then, did not support
the early enthusiastic notion that TGG provided a model of
the language process. This, though, was not actually the
intent of TGG , according to Chomsky (1965, p. 9):

> When we say that a sentence has a certain derivation
> with respect to a particular generative grammar, we say
> nothing about how the speaker or hearer might proceed,
> in some practical or efficient way, to construct such a
> derivation.

If this view is accepted as a statement of the scope of TGG,
then the grammar is not vulnerable to criticism from
experiments which investigate the language process.
However, many other statements by Chomsky can be interpreted
as meaning that TGG is intended to provide a model of the

language process. For example, Chomsky has stated (1966, p. 75, n. 2) that a TGG "constitutes a hypothesis as to how the speaker-hearer interprets utterances." The correspondence hypothesis is not a farfetched interpretation of such a claim.

For the present study, the weaker claim -- that TGG provides a model of only the language product -- is of interest. However, if a correspondence between the language process and the rules of a TGG is not claimed, then the relevance of psycholinguistic experimentation as a test of the model's adequacy is not immediately clear. The necessary link is provided by Chomsky's notion of "descriptive adequacy." In order for a TGG to be descriptively adequate, Chomsky (1965, p. 24) maintained that its output -- the structural descriptions it assigns to sentences -- has to match the intuitions of the native speaker concerning such sentence properties as acceptability, paraphrase classes, and ambiguity (see Derwing, 1973, p. 160). In psycholinguistic experiments, such native speaker judgments about sentences can be collected. Clearly, these intuitions provide data only about surface properties of the given sentences; such experiments are not expected to yield information about the psychological reality of the grammar's mechanisms for providing the structural descriptions, or for relating deep and surface structures.

The structural descriptions which the TGG assigns constitute psychological predictions if the grammar is claimed to be "descriptively adequate," in Chomsky's terms. These predictions can be tested, at the surface structure level, against language-user judgments. If this kind of check is done for a carefully chosen, grammatically well-defined set of sentences, then the results may provide a useful test of the grammar's descriptive adequacy.

For example, Fletcher (1973) showed that native speakers reliably observe meaning differences among clefted sentence constructions which the Standard Theory Model (STM)[1] defines as systematic paraphrases. Thus, the STM was found to be descriptively inadequate as a reflection of native speakers' intuitions about the meaning-equivalence of clefted sentences.

TGG Accounts of Focus

An aim of the present study is to investigate the descriptive adequacy of the grammatical accounts of focus. Theories of TGG have only recently tried to account for focus, which is therefore represented somewhat differently in the various grammatical models. In revised versions of the Standard Theory (Chambers, 1970; Jackendoff, 1972), arbitrary markers have been proposed, either at the deep or

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1. The STM is the TGG model proposed by Chomsky, 1965.

surface structure level, to account for focus. The markers, of course, are not intended to appear randomly in feature matrices; they are introduced to reflect certain psychological properties of the marked constituent. One common psychological attribute of a focused constituent, in the view of several linguists at least (e.g., Chambers, 1970; Chafe, 1970; Chomsky, 1971; Jackendoff, 1972) is its increased importance, relative to other constituents in the sentence and to its own normal or "unmarked" status. This increased importance of a focused constituent is reflected at the surface structure level, because the associated markers are in turn linked to well-defined changes in the derivation of the sentence.

That several grammatical constructions should be treated as realizations of focus has been proposed on intuitive grounds (e.g., Chambers, 1970, p. 27); a few observations of this kind have been incorporated into TGG models. These grammatical constructions can be conveniently divided into two groups -- those involving syntactic permutations, hereafter called "syntactic focus devices," and contrastive stress, which involves no reordering of constituents.

The linguistic background to this study consists of a discussion of the various theoretical accounts of syntactic focus and contrastive stress. Following this, some typical studies from the experimental literature on focus are

examined.   Then, the various grammatical descriptions and
predictions concerning focus are discussed for the sentence
types of interest in this study.   The experimental data,
discussed in the later chapters, will provide a basis for
evaluating these grammatical descriptions.

The Experimental Data

In this study, grammatical predictions about focus were
measured against native speakers' judgments about the
relative importance of the various constituents of each
sentence in a set.   For simple dative sentences, such as
(1), subjects were asked to rank order the three NP's and
the verb according to their importance to the meaning of the
sentence:

(1) John gave the book to Andrew.

The sentences, which were presented aurally, varied from the
basic sentence (1) in terms of sentence voice, indirect
object position, and location of contrastive stress.   From
the distribution of responses, information was obtained
about the subjects' judgments concerning the importance of
the constituents of the sentence.   For the sentence types
under investigation, the experiment revealed, by comparing
the effects of passivization, contrastive stress, and dative
movement, which grammatical properties were operative in
altering focus.   This result was then compared with the
theoretical predictions concerning focus.

CHAPTER TWO

SYNTACTIC FOCUS DEVICES

Preliminaries

At the base of any interest in the question of
syntactic focus is an interest in semantics, and in
particular, an interest in how users of a language convey
differences in meaning by using syntactic constructions.
Because approaches to semantics have varied widely among
linguists, so have accounts of syntactic focus. Linguists
such as Halliday recognized the importance of focus, but
made no attempt to formalize the notion. Early
transformationalists, on the other hand, ignored semantics
as much as possible, and therefore did not so much as
mention syntactic focus. During this stage of linguistic
development, at least for Chomsky and his followers,
interest centred on discovering syntactic patterns among
sentences which are related in meaning. They therefore
discussed only the syntactic structure of the sentences, and
provided simple rules in an effort to express what they saw
as the close and natural relations between these sentences.
No attempt was made to discuss meaning equivalence itself.

In Syntactic Structures, Chomsky (1957, p. 90) viewed a

declarative sentence and its corresponding WH-questions as being "understood in a similar manner." This was the closest he came to discussing meaning equivalence. It is not surprising that during this period, when all efforts were directed toward expressing certain syntactic relationships which hold among sentences, no attention at all was given to considerations of syntactic focus devices. These would represent syntactic ways in which the language user expressed differences in meaning, whereas Chomsky's task was to formalize the way in which the language user perceived similarities in meaning among different syntactic structures.

Transformationalists did not long confine their interest solely to syntax, however. In 1963, Katz and Fodor introduced some ideas regarding what the semantic component of a grammar should be like. The relation of the semantic component to the syntactic and phonological components was discussed in 1964 by Katz and Postal. In particular, they suggested that transformations be "meaning preserving." Again in their work, as in Chomsky's earlier works, there was no attempt to get at the problem of meaning equivalence. In Aspects of the Theory of Syntax, Chomsky (1965) adopted the Katz - Postal principle and also refined his earlier notion of meaning equivalence by stating that rules such as interrogation and negation were not meaning-preserving. Interest at this time was still centered on syntax, although the effect of consideration of a semantic component was

showing up in discussions of syntax.

Further refinements in the notion of meaning
equivalence were formulated, although still no attempt was
made to classify the various notions of meaning equivalence
or their implications for grammatical theory. In 1969[1],
Chomsky proposed that some transformations do not preserve
meaning. Further, he attempted to characterize how much
meaning changing occurred in the transformational component,
and whether such meaning changes were restricted to a
particular kind of meaning. It was then that syntactic
focus re-entered the linguistic stage, and linguists began
to talk about subtle changes in meaning introduced by such
devices. Since 1969, some work has been published on the
formal nature of focus devices, but little effort has been
made to back up the theoretical claims with experimental
evidence.

Meaning Equivalence

There has been a recent trend, as discussed above, to
recognize that the class of syntactic phenomena previously
grouped together as stylistic variants contains some
syntactic relationships that may be considered to reflect
changes in focus. Recognition of this refinement depended
on noticing a corresponding refinement in the notion of

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1. This proposal appeared first in mimeograph form. It was
later published as Chomsky (1971).

meaning equivalence, and a reduction in the number of
syntactic structures that may be considered to belong to a
single equivalence class. Only very recently, however, has
any comprehensive attempt been made to come to grips with
the problem of meaning equivalence. Since this is a very
basic problem to grammatical theory, and particularly since
lack of work in this area has prevented a satisfactory
formalization of the notion of syntactic focus, some
discussion of meaning equivalence is required here.

Passivization itself is one transformation which is
classified differently in various models of transformational
grammar. This inconsistency reflects a pervasive confusion
about the nature of semantics. In the Standard Theory,
passivization is semantically insignificant, or meaning-
preserving. In Chomsky's later revisions of the Standard
Theory, as exemplified in such papers as Chomsky (1971),
passivization is meaning changing, but in a more subtle way
than are transformations such as negation. For this reason,
Chomsky (1971) still did not see such meaning changing as
occurs in passivization to be a threat to the existence of a
deep structure level at which the meaning of the sentence is
completely specified.

In contrast, the generative semantics point of view is
that any type of meaning changing should be removed from the
transformational component of a grammar; the underlying
structure must therefore reflect eventual surface

constructions such as the passive. Thus, generative semantics makes no distinction between the extent of meaning change brought about by passivization and that caused by negation.

A look at some recent experiments in psycholinguistics (Clifton & Odom, 1966; Miller, 1962; Mehler, 1963; Fillenbaum, 1971), also provides striking evidence that linguists are not in agreement on how to interpret the notion semantics , and especially the relation between semantics and syntax. In explaining their own experimental results, and in attempting to eradicate the confusion of these earlier studies, Baker, Prideaux, and Derwing (1973) found it convenient to define semantics in two independent categories, which they called semantics of content (Sc) and semantics of type (St). Sc, in their terms, refers to "the specific lexical items and the functional relationship among them"; St refers to "the semantic significance of a specific syntactic pattern [p. 24]." It is interesting to note that in this study, syntactic patterns involving negation, interrogation, and passivization were all classified as St phenomena. Passivization, then, was not viewed simply as a focusing device by Baker et al. , who nonetheless found that passivization differed in some way from negation and interrogation. They concluded that "differential semantic weight" might be considered as a device in the grammar to mirror the difference they found in the language user's approach to these three transformations.

The problem of interpreting the notion semantics can be approached from the point of view of clarifying the various opinions advanced by linguists regarding meaning equivalence and paraphrase sets. This was the approach taken in a study by Fletcher (1973), who proposed a three-way distinction in the use of the term -- semantics of content (Sc), semantics of mode (Sm) and semantics of discourse (Sd). Fletcher's definition of Sc is the same as that given by Baker et al. Sm[1] is seen as including those "aspects of structure which signal the 'attitude' of the speaker towards the content-semantics of the utterance [Fletcher, 1973, pp. 15-16]"; examples would include negation and interrogation transformations. Sd involves the linguistic context of the utterance, which may affect the order of items in a sentence; focus and topicalization are examples of Sd phenomena.

By considering semantics in these three categories, Fletcher was able to make some interesting observations concerning the literature. First, it was approximately Sc-equivalence that concerned Zellig Harris (1957) and Chomsky (1957) in defining equivalence classes of sentences, or sentence families. For example, Chomsky suggested that a kernel sentence and its question transforms, such as 1(a)-1(d) below, are "understood in a similar manner" (1957, p. 90):

_____

1. Hereafter referred to as semantics of type (St), which replaces the earlier definition of St given by Baker et al.

(1) (a) John ate an apple.

  (b) Did John eat an apple?

  (c) What did John eat?

  (d) Who ate an apple?

Here, Fletcher pointed out, only sentences 1(a) and 1(b) are
Sc-equivalent. In drawing attention to the similarities
among sentences such as 1(a)-(d), Chomsky opted for
equivalence classes which are somewhat wider even than Sc-
equivalence classes.

  Within the Standard Theory, syntactic paraphrase is
defined by (Sc + St)-equivalence, which Fletcher (p. 18)
called paraphrase[1] (P[1]) equivalence. Thus, sentences 1(a)-
(d) given above would all fall into different equivalence
classes, but sentences 2(a)-(c) below would all belong to
the same class. That is, 2(a)-(c) are syntactic paraphrases
in the Standard Theory:

(2) (a) Did John eat the apple?

  (b) Was the apple eaten by John?

  (c) John ate the apple?

  As concern with semantics grew, however, it became
obvious that the paraphrase classes allowed by the STM could
be further divided. Fletcher argued for a distinction
between St and Sd, on the basis that discourse phenomena
such as focus and topicalization, which were not considered
semantically relevant in the STM, and which therefore were

not included in defining P^1-equivalence, may in fact be psychologically relevant. Thus, two sentences which are P^1-equivalent may not be equivalent when linguistic context is considered. He therefore defined P^2-equivalence to be (Sc + St + Sd)-equivalence. This is a strong form of sentence-equivalence, but Fletcher hypothesized that in a situation where context is provided, subjects would be able to pick out P^2-equivalent subsets from P^1-equivalent sets.

Certainly, the distinction between St and Sd is an important one. On the one hand, failure to make the distinction created much confusion among linguists discussing meaning equivalence; its inclusion in the theoretical framework reduces this confusion and allows one to better understand the apparent discrepancies among linguists. On the other hand, this distinction is valuable to a discussion of syntactic focus, because it points out an important distinction, with respect to the semantic role of focus, between the claims of the Standard Theory and those of later refinements to the theory. Thus, focus phenomena were seen as semantically empty in the STM; later refinements of the theory were motivated in part by a consideration of focus.

Halliday's Treatment of Focus

Halliday's discussion of focus in English, although not developed within transformational theory is, nonetheless, of particular interest, for two reasons. First, Halliday developed his ideas on focus within a semantic framework consisting of three areas of meaning, which are much like the areas of Sc, St, and Sd discussed above. For each of these three semantic areas, there is a corresponding area of syntactic options, which he called transitivity, mood, and theme (1967, p. 199):

> Transitivity is the set of options relating to cognitive content, the linguistic representation of extralinguistic experience... Mood represents the organization of participants in speech situations, providing options in the form of speaker roles: the speaker may inform, question or command; he may confirm, request confirmation, contradict... Theme is concerned with the information structure of the clause; with the status of the elements... as components of a message; with the relation of what is being said to what has gone before in the discourse...

Within the area of theme, Halliday discussed six related sets of syntactic options. Of these, "information" and "thematization" are of interest here. Options in the information category "are realized by phonological features of information," while "those of thematization [are realized] by the sequence of elements in the clause [p. 200]." The term "theme" is used both as a general cover term, corresponding to "focus" in the present study, and as a specific function in the distribution of information in the clause.

Halliday proposed that an utterance be divided into information units, each one realized phonologically as a tone group. One information unit would correspond to one clause in the "unmarked" mapping of information structure onto sentence structure, although in marked options the information unit could be more than or less than one clause. By his selection of information units, then, the speaker is said to organize his message into a linear arrangement.

The selection of points of information focus, which are points of prominence within a message, is made for each information unit. The information focus is realized by the assignment of the tonic in the tone group. Information focus is thus a kind of emphasis within Halliday's framework. Further, the focus of the information unit is seen by Halliday to represent the information which the speaker deems not to be recoverable from the preceding discourse. This information, which determines the domain of focus, is assigned the function "new." In general, the domain of focus consists not just of the tonic component, but of "the highest rank constituent within which the syllable that is tonic is the last accented syllable [p. 207]." Thus for each information unit, the intonation pattern reflects what information is "new" and what is "given." There is a tendency, Halliday noted, for non-focal material to precede the focus in the information unit. However, Halliday's system includes word order as a separate aspect of thematic organization from intonation. The

syntactic option which is realized by the sequence of elements in the clause is that of "theme-rheme." The theme is assigned initial position in the clause, and the rheme is what follows.

Thus, Halliday viewed intonation pattern and word order as independent aspects of the clause. He distinguished the functions "given" and "theme" in the following way (p. 212):

...'given' means 'what you were talking about'...,
'theme' means 'what I am talking about'.

Halliday noted though, that "theme-rheme" and "given-new" are related, in that the focus of information in the unmarked case falls within the rheme.

In Halliday's terms, an information unit with unmarked focus does not imply any preceding information, or specific question. The domain of such unmarked focus may be the entire information unit. Thus "JOHN painted the shed"[1] implies a specific question such as "Who painted the shed?", and is thus an example of marked focus. However, "John painted the SHED" may simply imply "What happened?", rather than necessarily implying a specific question like "What did John paint?" An information unit with unmarked focus is ambiguous with respect to its structure specification, which may be either "given-new" or just

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1. The position of the tonic is indicated by capital letters.

"new." Halliday stated that the ambiguity tends to be resolved in informal speech; for example, contrastive tone would imply specific focus on "the shed," while normal intonation would suggest the other interpretation (p. 208).

Unmarked focus, then, is realized as the location of the tonic on the final lexical item of the information unit; it assigns the function "new" to the focal element but does not specify the rest of the information unit. Marked focus -- any other location of the tonic -- assigns the function "new" to the focus, and "given" to the remainder of the information unit.

Thematization, or the assignment of functions "theme" and "rheme," is developed in less detail by Halliday, and in general has had little impact on transformational work. As mentioned earlier, the theme is what comes first in a clause. In declarative sentences the unmarked theme is the surface subject. Thus the passive can be regarded as an option in which the theme remains unmarked, and in which the agent is non-thematic. In fact, the passive allows the agent to be omitted, and this is the most frequent use of the passive (Svartvik, 1966, p. 141).

Halliday viewed the passive as having the effect of emphasizing both the agent, if it is specified, (as the point of new information) and the surface subject (as what the message is about). In terms of Halliday's notion of domain of focus, the passive could be regarded as

emphasizing the agent if it is the specific focus, signalled
for example by contrastive stress, but not emphasizing the
agent if the domain of focus is the whole information unit.
Halliday did not make this distinction, however. Thus, word
order (theme-rheme) and intonation (given-new information)
are two basic sets of syntactic options in Halliday's
account of the grammar of discourse. The influence of
Halliday's work concerning the information functions within
the area of theme is readily seen in the more recent
transformational accounts of focus which are discussed below
and in Chapter Three.

Early TGG Accounts of Syntactic Focus

As mentioned earlier, focus devices are Sd phenomena,
and were not discussed in the development of the theory of
transformational grammar until the late 1960's, after the
more obvious areas of Sc and St had been discussed.
However, despite the fact that the term focus was not
introduced until recently, passive and dative movement rules
were present in transformational grammars at a relatively
early date; their interpretation and their influence on
evolving transformational theories are discussed here.

Zellig Harris

Harris' work in the 1950's is the place to begin a discussion of the treatment by transformational grammars of meaning equivalence, since it was he who introduced the notion of transformation to linguistic theory. However, Harris' transformations were developed with minimal reference to meaning; the emphasis was on studying combinatorial properties and, in particular, the individual co-occurrences of classes of morphemes.

In Harris' theory, transformations are defined only for those constructions which have classes with approximately the same co-occurrences. For example, most triples of N^1, V, and N^2 in the active sentence $\underline{N^1}$ $\underline{v}$ $\underline{V}$ $\underline{N^2}$ can be found in the passive sentence $\underline{N^2}$ $\underline{v}$ $\underline{be}$ $\underline{Ven}$ $\underline{by}$ $\underline{N^1}$. Thus, the following sentences are related by a reversible transformation (1957, p. 160):

(3)   (a) The kids broke the window.

      (b) The window was broken by the kids.

Harris noted (p. 161), however, that "some major element of meaning seems to be held constant under transformation." His description of possible meaning differences is particularly interesting, since two of the differences he mentioned are examples of what have here been called Sd and St (p. 162):

> There may be [Sd] differences in emphasis or style, as
> between the active and the passive. And certain
> transforms have specific [St] meaning differences
> associated with the specific morphemes they add, as
> between assertion and question.

He concluded:

> But aside from such differences, transforms seem to
> hold invariant what might be interpreted as the [Sc]
> information content.

For Harris, then, the similarities between transforms
are characterized by Sc invariance, while the differences
can be classified as those of Sd or St. Although Harris
classified the difference in meaning between actives and
passives as one of emphasis, this suggestion was not picked
up for several years by the transformational grammarians,
probably because they were more influenced by Chomsky's
claim (1957) that the semantic link between actives and
passives was unclear.

Chomsky: Syntactic Structures

In Syntactic Structures, Chomsky viewed active and
passive sentences as being syntactically related (1957,
p. 43):

> If S^1 is a grammatical sentence of the form
> $NP^1 - Aux - V - NP^2$,
> then the corresponding string of the form
> $NP^2 - Aux + be + en - V - by + NP^1$
> is also a grammatical sentence.

Further, only the active sentence is included in the kernel,

while the transformation involved is that which interchanges
NP¹ and NP², and replaces $\underline{V}$ by $\underline{is} \pm \underline{V} \pm \underline{en} \pm \underline{by}$ (p. 77).
Thus, passive sentences are derivationally more complex than
active sentences, in Chomsky's model.

Chomsky's attempt to formulate grammar as independent
of semantics was not successful. In order to show that
transformations increase the adequacy of a grammar, he was
obliged to discuss sets of sentences which are "understood
in a similar manner," such as the sentence "John ate an
apple" and its question transformations which were mentioned
earlier as sentences 1(a)-(d). In motivating the idea of
transformations, Chomsky (1957, p. 91) claimed that they
provide a simple way of relating such sentences, in a way
such that "any speaker of English will understand these
sentences according to this pattern," while phrase structure
grammar does not provide this. This relation, of course, is
not independent of meaning. To be sure, Chomsky (1957) was
not interested in fine distinctions of meaning, since he was
drawing attention to broad semantic similarities among
sentences.

Chomsky viewed the semantic relation between an active
sentence and its corresponding passive as somewhat tenuous.
He asserted (p. 101) that "not even the weakest semantic
relation (factual equivalence) holds in general between
active and passive." This conclusion is based on his
interpretation of such sentence pairs as (4), which involve

quantifiers (pp. 100-101):

    (4)   (a) Everyone in the room knows at least two
               languages.

        (b) At least two languages are known by everyone
               in the room.

He claimed that these two sentences are not equivalent in
meaning.

In 1957, then, Chomsky considered the active - passive
syntactic relation to be a basic aspect of linguistic
structure. However, he viewed the semantic relation between
actives and passives to be somewhat more complex; in fact,
he felt that if the active - passive relation had been
considered basically in terms of synonymity, then the
transformational relation would not have come to light
(p. 101). In view of such an outlook, it is easy to see why
Chomsky looked at meaning similarities only, and hesitated
to investigate finer meaning classifications, such as P^1-
equivalence.

Chomsky's interpretation of semantics is restricted to
Sc; he considered kernel sentences to be the "elementary
content elements" from which sentences are constructed
(p. 108). Further, he avoided specifying the meaning
properties of transformations, presumably because of his
remarks concerning the passive transformation applied to
kernel sentences containing quantifiers (1957, p. 108):

The notion of 'structural meaning' as opposed to

'lexical meaning', however, appears to be quite suspect, and it is questionable that the grammatical devices available in language are used consistently enough so that meaning can be assigned to them directly.

Thus, Chomsky viewed the passive transformation as bringing to light an important meaning similarity. Its semantic properties, however, were unclear to him.

Katz and Postal

In attempting to specify the nature of a semantic component for a transformational grammar, Katz and Postal were forced to come to grips with the notion of "structural meaning" which Chomsky had avoided considering. Katz and Postal (1964) suggested that all transformations preserve meaning. This notion was motivated by formal considerations, in order to simplify the nature of the semantic component which they were then proposing. Thus, such transformations as negation and interrogation were reclassified as obligatory transformations, triggered by a marker in the underlying structure.

The sentences "John hit Mary" and "Did John hit Mary?" are thus derived from different underlying structures, the second of which contains the universal morpheme Q. The intuitive relationship between such sentences is reflected in the similarity of their underlying structures, which differ only in the presence or absence of such universal markers as Q, Negative, Passive, and so on. In the Katz-

Postal model (p. 118), underlying structures which differ in morphemes which are particular to given languages, such as will or must, are not considered to be as closely related syntactically as active-passive or affirmative-negative pairs. Thus, although passive sentences were no longer derived from an active kernel sentence, the intuitive relation between them, which Chomsky was so anxious to capture in his grammar, could still be expressed as a specific type of similarity at the level of their underlying structures.

The distinction between Sc and St is clear in Katz and Postal's description, although they did not state it in these terms. The presence of identical language-specific morphemes in two sentences means that they are Sc-equivalent; however, only if, in addition, they have the same complement of universal markers (same St) can they be considered to be paraphrases. Thus, for Katz and Postal, systematic paraphrase is defined as (Sc + St)-equivalence, here called P¹-equivalence, although the intuitive relationship between sentences which are Sc-equivalent is still reflected in their model. In the Katz-Postal model, passive sentences are not derived from active sentences, but rather from an underlying structure which contains the passive marker in the form of an adverb of manner constituent dominating by plus a passive morpheme dummy. Katz and Postal thus regarded active and passive as two different sentence types with distinct underlying

structures; as such they do not satisfy the famous Katz-
Postal condition for systematic paraphrase (1964, p. 157,
emphasis added):

> Given a sentence for which a syntactic derivation is
> needed; look for simple paraphrases of the sentence
> which are not paraphrases by virtue of synonymous
> expressions; on finding them construct grammatical
> rules that relate the original sentence and its
> paraphrases in such a way that each of these sentences
> has the same sequence of underlying P-markers.

Nonetheless, Katz and Postal, on considering Chomsky's
example of passivization of sentences involving quantifiers,
concluded that the evidence that passives are not synonymous
with their corresponding actives is not convincing. They
viewed such sentence pairs as "Everyone in the room knows
two languages" and "Two languages are known by everyone in
the room" as ambiguous, with both sharing the same two
meanings. They asserted (p. 72):

> Thus it seems that both actives and passives containing
> quantifiers and pronouns are ambiguous in the same way
> and so are full paraphrases of each other.

They suggested, then, that the difference in the underlying
P-markers of an active-passive pair is not semantically
significant. This qualification should perhaps be included
in their principle of systematic paraphrase. However, they
did note that if any convincing evidence appears which
indicates that an active and its corresponding passive
differ in meaning, then their theory can handle this problem
by stating that the differences in the underlying P-markers

do have a semantic effect.

Thus, Katz and Postal tried to characterize both the semantic and the syntactic relationships which hold between active-passive sentence pairs. In general, their notion of paraphrase is (Sc + St)-equivalence, but their insistence that active and passive sentences, while being systematic paraphrases, are not St-equivalent, clouds somewhat the boundaries of their paraphrase sets.

Chomsky: Aspects of the Theory of Syntax.

Chomsky (1965) accepted the Katz-Postal principle with enthusiasm, and hinted that it might be a special case of the following general principle (p. 233, n. 3): "'nonstylistic transformations' are all signaled by optional markers drawn from a fixed, universal, language-independent set." He admitted that a much closer analysis of the notion "nonstylistic transformation" was required. The fact that in formulating what has come to be known as the Standard Theory, Chomsky accepted this principle, together with the suggestions as to what markers were necessary in the base (e.g., Q, Negative, Passive, etc.), led to the widespread view that paraphrase sets were those defined by (Sc + St)-equivalence. For example, such a theoretical position was the basis of some experimental work on paraphrase by Gleitman and Gleitman (1970), whose work was done while confidence in both the notions of deep structure and the

Katz-Postal principle was still unshaken.

Chomsky in fact stated in the opening pages of Aspects of the Theory of Syntax, that "the central idea of transformational grammar" is that deep and surface structures are distinct (p. 16). Furthermore, he made it clear that his concern in this book was primarily with deep structure (p. 17). From the point of view of empirical considerations concerning meaning preservation, however, those passages in which Chomsky's concern shifted momentarily to surface structure provide the most interesting reading. Because deep structures, as formulated, are immune to empirical testing, the psycholinguist is limited to assessing the effects of surface structures. Thus, any surface structure consequences of the various claims made about deep structure are of interest. In particular, the surface structure constraints on the sets which the Standard Theory defines as meaning equivalent (P[1]-equivalent) are relevant to any experimental work on meaning equivalence.

Within this framework, Chomsky's consideration of passives is one of the most interesting issues in the book. Returning to his earlier example of passivization applied to sentences containing quantifiers, Chomsky again stated that the sentences "Everyone in the room knows at least two languages" and "At least two languages are known by everyone in the room" are not synonymous. He suggested that surface structure considerations -- in this case, the order of

quantifiers in the surface structure -- affect the semantic
interpretation (p. 224, n. 9). Thus while Chomsky was
willing to state (p. 233, n. 3) that "the passive marker ...
has no independent semantic interpretation," he did not
see a clear semantic equivalence between certain active-
passive sentence pairs.

A further interesting observation regarding Chomsky's
account of the Standard Theory is that the beginnings of
concern with semantics of discourse (Sd) were evident
(p. 163), although Chomsky regarded his observations in this
area as confusing and inconclusive. He quoted Wilson (1926)
on the question of a distinction between the grammatical
subject and predicate of a sentence and its psychological
subject and predicate. Wilson (1926, p. 119) suggested
generally that "the same form of words should be analyzed
differently according as the words are the answer to one
question or another." A more specific, and very interesting
comment of Wilson's (p. 119) is that in the statement "<u>glass</u>
is elastic":

> 'glass', which has the stress, is the only word which
> refers to the supposed new fact in the nature of
> elasticity, that it is found in glass...[and
> therefore]...'glass' would have to be the predicate...

Thus, the psychological subject and predicate of a sentence
would now be discussed as examples of focus phenomena. This
passage is also intriguing because it deals specifically
with the grammatical correlates of the semantic notions of

new and old information, a subject which has recently been
discussed again (Chafe, 1970; see p. 44 below).

Thus, Chomsky (1965) was concerned mainly with the deep
structure, distinct from surface structure, which sets the
STM apart from earlier structural accounts. However, he
raised several issues concerning semantic differences which
were clearly surface structure phenomena. These problems,
which seem to be unrelated in the Standard Theory, can be
grouped together in a theory which includes consideration of
focus phenomena.

Recent Linguistic Accounts of Focus

Much of the work in linguistic theory since 1965 has
been motivated by an increasing concern with the semantic
component of the grammar. An interesting feature of recent
publications has been the frequent use of words such as
"topic" and "focus." These are theoretical terms which are
used to categorize certain kinds of differences in meaning
between sentences which were considered in the Standard
Theory to be meaning equivalent. The treatment accorded to
focus phenomena varies considerably among the recent works
published; it depends to a large extent on the particular
version of the theory which is espoused, and in turn it has
been one of the more influential considerations involved in
formulating the theoretical models, particularly regarding

the nature of the semantic component.

Interpretive Semantics

That development of the Standard Theory which is known as interpretive semantics, or the Extended Standard Theory, can basically be characterized by its retention of the importance of the deep structure level and its reluctant dismissal of the notion that transformations must be meaning preserving. Consideration of surface structure phenomena such as contrastive stress, and the recognition that such phenomena could influence meaning equivalence, had led to dissatisfaction with the elegant STM. Forced to admit that such surface structure phenomena were semantically significant, Chomsky (1971) defined a notion of surface focus, which was seen essentially as a phonological phenomenon. Chomsky (p. 205) defined focus to be "a phrase containing the intonation centre of the sentence," and (p. 203) referred his readers to Chomsky and Halle (1968) for a discussion of stress rules which, it was assumed, would clarify what was meant by "intonation centre."

An interesting aspect of Chomsky (1971) is his discussion of the dative shift transformation within the framework of surface focus. Thus, the following sentences were considered to be semantically distinct under considerations of focus (p. 203):

(5) (a) Did John give the book to Bill?

(b) Did John give Bill the <u>book</u>?

Respective appropriate responses were deemed to be:

(6)　(a) No, to someone <u>else</u>.

　　　(b) No, something <u>else</u>.

It is important to note that the above examples involve
normal intonation; contrastive stress is not present.　Thus
Chomsky suggested that dative movement is semantically
significant because it places a different lexical item in
the intonation centre of the sentence.

Chomsky introduced the notion of focus to explain why
certain constructions, such as dative movement, appear to
have semantic significance.　His stipulative definition of
focus was in terms of normal intonation, which is a surface
structure phenomenon.　It is important to notice that in
defining focus, Chomsky particularly avoided discussion of
contrastive stress, which he regarded (p. 205) as involving
"grammatical processes of a poorly understood sort."
Therefore, his definition of focus was based on normal
intonation, which, according to Chomsky and Halle (1968), is
at least partially predictable from the surface structure.
It is not surprising then that focus, defined in surface
structure terms, turns out to be best dealt with as a
surface structure phenomenon.　This was in fact the
conclusion which Chomsky reached, after considering the
alternative of focus specified in the deep structure.

Chomsky's discussion of surface focus has been influential. Even those who argue for deep focus are caught up in Chomsky's definition, and continue to think of focus in surface structure terms. This influence is clearly seen in Chambers (1970). In arguing for deep focus, Chambers still thought of focus in terms of the normal intonation centre of the sentence, as is evidenced by his discussion of the dative movement transformation in which he viewed "bringing into focus" as being the same as "back-shifting to the intonation centre."

The basic confusion seems to arise from the fact that focus was introduced to explain semantic differences, but no attempt was made to put focus into a semantic framework. Rather, focus was defined in terms which emphasized its connection with phonological phenomena and de-emphasized its semantic role. Clearly, a definition in terms of the semantic role is to be preferred; correlations with intonation phenomena could then be discussed as interesting points, but would not be the defining characteristics of the term. A semantic framework of the kind discussed earlier in this chapter would be of great value in discussing such notions as focus. Such a framework has recently been proposed, within the interpretive semantics school, by Jackendoff (1972).

Jackendoff proposed that the semantic component of the grammar consists of at least four subcomponents. The first

is _functional_ _structure_, which "represents relations in the
sentence induced by the verbs, including such notions as
agency, motion, and direction [p. 3]." This component
corresponds to the Sc discussed earlier. The second
component, _modal_ _structure_, is determined "from lexical
properties of modal operators and the structural
configurations of both deep and surface (or perhaps end-of-
cycle) structures [p. 378]"; this corresponds basically
to St. Thirdly, a _table_ _of_ _coreference_, to determine which
noun phrases are intended to be coreferential, is
constructed at the end of each transformational cycle. The
fourth component, _focus_ _and_ _presupposition_, is derived from
the surface structure, and designates "what information in
the sentence is intended to be new and what is intended to
be old [p. 3]."

Thus, for Jackendoff, focus is predictable from the
surface structure of the sentence, and extra-sentential
context is not considered. Jackendoff was strongly
influenced by Chomsky's surface focus defined in terms of
normal intonation, where focus is determined by predictable
elements of the sentence. However, the reason for the
surface structure order of the constituents, which in turn
determines focus in Chomsky's theory, is what must be
investigated if one is to determine whether focus has
semantic significance.

Jackendoff's brief treatment of dative movement was

limited to a statement of his opinion that (7a) is the
underlying form of the following pair (p. 156):

> (7)   (a) Dave sold a book to Pete.
>
>   (b) Dave sold Pete a book.

His argument for this was that the order of complements NP-
PP is common in English, while PP-NP and NP-NP are rare.
Hence, the base rules resulting in (7a) would be more
plausible than those required to give (7b). With this
choice of base form, the dative shift transformation must be
stated as a front-shifting of the indirect object. Thus, in
Jackendoff's model, the dative movement transformation moves
the indirect object away from the intonation centre.
Jackendoff, however, did not discuss dative shift in terms
of focus.

Unfortunately, Jackendoff did not indicate which
semantic subcomponent includes passivization. He simply
stated that passive does have an effect on the semantic
interpretation (p. 106); this indicates that passive must be
considered somewhere in the semantic component. Jackendoff
did seem to imply that the passive transformation's semantic
effect is characterized by a reassignment of the focus of
the sentence. This is part of his broader argument (p. 235)
that "choices of focus correspond to constituency in surface
structure, not deep structure." For example, sentence (8)
can have (9) as a possible answer:

(8)   Was "The Sound Pattern of English" reviewed by the New York <u>Times</u>?

(9)   No, it was made into a <u>movie</u>.

This answer, however, corresponds to the focus "(was) reviewed by the New York Times." Thus, constituents which can be focused include some which are not deep structure constituents, but rather derived structure constituents created by the passive transformation.

Another feature of Jackendoff's book which has some bearing on the passive transformation is his discussion of thematic relations based on Gruber's work. The five thematic relations which Jackendoff discussed are theme, location, source, goal, and agent. Of these, <u>theme</u> is the most basic notion; "in every sentence there is a noun phrase functioning as Theme [p. 39]." These are semantically defined concepts which are determined at the level of deep structure, and therefore belong to that aspect of semantic representation which Jackendoff has called functional structure, similar to semantics of content (Sc). Thematic relations, then, appear to be similar to Fillmore's case relations (1968). An important difference though is that a single underlying noun phrase can function in more than one thematic relation. For example (p. 34), <u>Max</u> in one reading of the following sentence functions both as <u>theme</u> (the NP undergoing the motion in a sentence involving a verb of motion) and as <u>agent</u>:

(10) Max rolled down the hill.

Jackendoff argued (p. 34) that case grammar, in which each noun phrase has only one deep structure case, can express all the relevant semantic information for sentences such as (10) only in a complicated way. Therefore, Jackendoff preferred Gruber's system of thematic relations to Fillmore's case grammar.

One advantage of adopting the notion of thematic relations is an interesting constraint on passivization which is possible in this system. A condition which seems to hold on passivization is this (1972, p. 43):

Thematic Hierarchy Condition
The passive by-phrase must be higher on the
Thematic Hierarchy than the derived subject.

The following hierarchy is proposed:

The Thematic Hierarchy
1. Agent
2. Location, Source, Goal
3. Theme

Thus Jackendoff specified a direct dependence of passivization on functional structure (Sc). His view, then, was that application of the passive transformation depends on the functional structure (Sc) of the sentence and that, once applied, it has the effect of reassigning the focus of the sentence. To summarize his use of the terms, theme is a semantics of content notion, and focus is a phonological, surface structure phenomenon. Jackendoff's use of the term

"theme" thus contrasts with Halliday's account, where "theme" is a discourse phenomenon.

Generative Semantics

Generative semantics is a development of the Standard Theory which retains the Katz-Postal principle that transformations preserve meaning. Consistent acceptance of this principle, however, has required that more abstract underlying structures than the Standard Theory "deep structure" be postulated. The generative semanticists claimed that these abstract structures are closer to the underlying semantic structure.

Lakoff (1971, p. 283) described the generative semantics treatment of such constructions as question and imperative in underlying structures as the "natural syntax" position, which is that "the 'deep structure' phrase-marker of the sentence contains the semantic representation corresponding to the construction directly." In contrasting his treatment of such phenomena with that of interpretive semantics, he dubbed the latter's framework "arbitrary syntax." Lakoff (p. 283) made the following comment about the interpretive semantics treatment of constructions such as the imperative or question:

> ..the deep structure corresponding to a construction of
> the sort described never contains the phrase-structure
> configuration of the meaning of the sentence directly.
> Instead, the deep structure corresponding to the
> configuration must contain some arbitrary marker.

Lakoff's further discussion of this topic shows that he considered such "arbitrary markers" to be poorly motivated. However, Partee (1971, p. 6) has pointed out that all such markers discussed by Katz and Postal (1964) were independently motivated.

The generative semantics position, then, does not distinguish its treatment of St phenomena from that of Sc phenomena. Both are represented "directly" and abstractly in the underlying structure. The further suggestion that Sc, as defined here, does not hold a basic position with respect to meaning equivalence is evident in many publications by generative semanticists. For example, Postal (1971) insisted that the surface verb "remind" does not occur in the underlying structure, but rather is derived by way of "the strike-like analysis." Since the underlying lexical items strike and like (or strike and resemble) can occur in the surface structure, unaltered by the optional remind-formation transformation, the following sentences have the same deep structure in Postal's analysis (1971, p. 235):

   (11) Max reminded me of Peter.

   (12) Max struck me as resembling Peter.

According to generative semanticists, then, transformations preserve meaning, but they do not necessarily preserve lexical items (Postal, 1971, p. 245):

In general, those structures which provide the input to transformational rules are not defined even in part by a relation to surface structures which is "lexical item preserving".

Thus, in the generative semantics framework, sentences which are paraphrases are not necessarily Sc-equivalent, if Sc-equivalence is defined, as by Fletcher (1973, p. 14), to include "sameness of lexical items."

This observation is correctly interpreted by Fletcher (1973, p. 42) as a relaxation of the STM constraints on meaning equivalence. One might gain the mistaken impression of an overall weakening of the constraints on meaning equivalence if one considers generative semantics within the framework of semantic distinctions discussed earlier in this chapter, since Sc-equivalence is assumed in this framework to be somehow more basic than other types of meaning equivalence. However, it seems that generative semantics does not easily fit this semantics framework; lexical items and their functional relationships are treated as no more basic than are modal constructions (such as question) in the underlying structures of generative semantics.

It seems to be inaccurate to suggest that in the generative semantics position, the constraints on meaning equivalence have been relaxed. Rather, within the semantics framework discussed above, the constraints on meaning equivalence have simply shifted from those of the STM. In fact, generative semanticists give considerably more

attention to the importance of Sd-equivalence than did

linguists who worked within the Aspects model.

Lakoff (1971, p. 234), in discussing the generative

semantics theory, which he called the basic theory, proposed

the following semantic structure for the grammar:

> Given a syntactic structure (P(1),...P(n)) we define
> the semantic representation SR of a sentence as SR=
> (P(1),PR,Top,F,...), where PR is a conjunction of
> presuppositions, Top is an indication of the 'topic' of
> the sentence, and F is the indication of the focus of
> the sentence.

He further suggested that Halliday's notion of focus, which

was adopted by Chomsky, can be handled naturally within the

basic theory. Lakoff claimed that such a notion of

information focus can be approached by means of a global

derivational constraint which states the correspondence

between the elements PR and F of the semantic

representation, and the corresponding surface constituents.

Lakoff pointed out two problems with Chomsky's

treatment of focus as a surface-structure phenomenon.

First, he questioned the validity of assuming that the item

which receives main stress must be considered to provide new

rather than presupposed information. His example (p. 261)

is:

(13) The TALL girl left.

Lakoff suggested that here "the semantic content of the

focus is an assertion of coreferentiality," namely that "the

new information is that the girl who was presupposed to have left is coreferential with the girl who was presupposed to be tall."

Secondly, Lakoff questioned Chomsky's assumption that focus can be accounted for in terms of surface structure constituents. He considered the following sentences, which have different surface structure constituents (p. 262):

> (14) (a) John looked up a girl who he had once met in Chicago.
>
> (b) John looked a girl up who he had once met in Chicago.

Lakoff claimed that these sentences do not differ in focus possibilities and their corresponding presuppositions. He also stated that Chomsky would predict such differences, since, in his model, focus is determined by the surface structure.

Both these arguments suggest that Chomsky's treatment of focus is inadequate, but Lakoff has provided only a sketchy account of an alternative treatment. Lakoff's comments about focus, then, serve to further the impression that this is an area of linguistics which needs considerable work.

Lakoff, in discussing "topic," again gave no clear indication of why such a notion is required in his theory. Again he assumed that it is well enough motivated by previous work outside generative semantics, and he stated

simply that "topic" can be handled naturally in the basic theory. Again he proposed that "topic" be handled by a global derivational constraint linking transformations and presuppositions. He also suggested (p. 263) that the following generalization might hold: "that surface subjects in some class of sentences are always topics." This is a somewhat odd general statement to make, following as it does the attack on Chomsky's position that surface structure seems to be closely related to focus. This is particularly so since Lakoff believed that "the notion 'topic' may well turn out to be a special case of presupposition [p. 263]," and he had just indicated in discussing sentences (14) that there is no simple dependence of presupposition on surface structure.

The only clear conclusion to be drawn from Lakoff's discussion of topic and focus, then, is that while Sd is seen as being relevant to an adequate linguistic theory, the treatment of Sd is as yet in an early stage. On the one hand, Lakoff's arguments suggest that Chomsky's relatively concrete description may be inadequate; on the other hand, Lakoff has not yet presented a proposal which is explicit enough to be evaluated.

Another Semanticist View: Chafe

Chafe belongs to neither the interpretive semantics nor the generative semantics school. He described his own view

as "semanticist", while he viewed that of the interpretive

semanticists as "syntacticist" (Chafe, 1970, p. 64).

Starting from the theme that language is a system for

converting meaning into sound, Chafe described his model of

language as having the following components (1970, p. 55):

> First, there are processes of "formation" by which a
> semantic structure is constructed at the outset.
> Second, there are processes of "transformation" by
> which a semantic structure is modified to become a
> surface structure, and by which, as well, an underlying
> phonological representation is converted into a
> phonetic one. And, third, there are processes of
> "symbolization" by which postsemantic units of a
> surface representation are replaced by underlying
> phonological configurations.

Although Chafe (1970, 1971) did not describe himself as a

transformationalist, his model, like the others discussed

here, does include a component which transforms semantic

structures into surface structures. Chafe (1970) did not

indicate his opinion of the generative semantics position,

or of its relation to his semanticist views. He did,

however, share their concern with "the basic role played by

semantic structure in the structure of language [p. 210]."

Chafe's position, then, is that "at the heart of an

adequate theory of language must be an adequate theory of

semantic structure [p. 11]." A second theme throughout the

book is his attempt to "identify certain noun-verb relations

[such as patient, agent, beneficiary] as forming the

backbone of semantic structure [p. 10]." In investigating

semantic structure, Chafe made a distinction between the

elements of a sentence which convey old information and those which convey new information. He argued that this distinction is motivated semantically, and is also reflected in postsemantic consequences, both syntactic and phonological.

Chafe discussed several of his ideas regarding old and new information, but his presentation is inadequate in that he failed to back up any of his specific claims with empirical evidence. His first assumption (p. 214) is that "there is one 'least-marked' distribution of old and new information in a sentence [p. 214]." An example of such a sentence (p. 215) is:

(15) Lisa received a present.

In this sentence, the first syllable of present has the strongest stress and highest pitch in the sentence; the underlining indicates this. The noun root present and also the verb root receive are seen as conveying new information. Chafe insisted (p. 216) that "high pitch is indeed a surface reflection of the semantic presence of new," although if he was correct about the verb root always conveying new information, while not receiving higher pitch, it is clear that the relation is not a simple correspondence.

Chafe next considered sentences with an indirect object (p. 217):

(16) David gave Lisa a picture.

His claim is that the verb root, the patient noun root
picture, and the beneficiary noun root Lisa all convey new
information if the sentence is unmarked with respect to the
distribution of old and new information. A general
statement of Chafe's remarks concerning the distribution of
old and new information in sentences (15) and (16) is the
following hierarchy for active sentences: agent is always
old information; beneficiary is old if it occurs without an
agent; patient is old if it occurs without an agent or
beneficiary; location is never old, because it never occurs
without a patient.

Chafe noted that if such a distribution of new and old
information is inappropriate in a given context, the
distribution can be changed by specifying the verb as
passive. In Chafe's model, then, one function of the
passive inflection is to alter the above order of priorities
for the distribution of new information. One result is that
"the agent noun root of a passive verb normally conveys new
information [p. 221]." Thus, in (17) below, the beneficiary
conveys old information, while the patient and agent noun
roots convey new information (p. 221):

(17) Lisa was given the picture by David.

This is an interesting remark about the underlying
reasons for passivization in "unmarked" situations, but
unfortunately it is confounded by reference to a poorly

motivated definition of the "unmarked" distribution of old
and new information. Chafe did not explain why, for
example, sentence (17) is more basic than (18) below:

(18) Lisa was given the picture by David.

Sentences (17) and (18) answer the questions (19) and (20)
respectively (p. 220):

(19) Why is Lisa so excited?
(20) Who gave Lisa the picture?

However, Chafe gave no indication of a reason for his
apparently arbitrary choice of considering questions like
(19) to be basic.

Because such properties as amplitude and pitch are
basic to Chafe's discussion about focus, his ideas are
somewhat similar to the intonation centre view of focus
adopted by the interpretive semanticists. However, in
Chafe's theory, the emphasis is on the semantic reasons
behind the increase in pitch and amplitude which
characterize focus; such changes are "related to an increase
in the effectiveness of communication [p. 213]."

Chafe, then, considered passivization to be
semantically significant. Dative movement, on the other
hand, has no simple semantic correlates in his theory.
Sentence (21) below contains, in the unmarked case, the same
distribution of old and new information as does sentence

(16):

    (21) David gave a picture to Lisa.

However, in Chafe's model, dative movement results in a
difference in information distribution for sentences in
which the verb is specified as passive (p. 221):

    (22) (a) The picture was given to Lisa by David.

        (b) Lisa was given the picture by David.

In Chafe's theory, the semantic significance of dative
movement in a given sentence depends on the presence of the
passive inflection in the verb. In terms of the Standard
Theory, then, Chafe would predict that dative movement is
semantically significant only when it occurs in conjunction
with passivization. This prediction might be altered if
Chafe were to distinguish various types of "new
information."

Revised STM: Chambers

    One further theoretical account of syntactic focus
devices which deserves attention is that of Chambers (1970).
Unlike Chafe's treatment of focus, which was motivated
semantically within his own framework, Chambers' treatment
was largely motivated by syntactic considerations.
Chambers' overall purpose was to attempt to revive the
Standard Theory by proposing a deep structure account of
those semantically significant phenomena which can be

described as focus devices. Chomsky (1971) felt that such a treatment would run the risk of being arbitrary, and of robbing the Katz-Postal principle of its empirical content. Nonetheless, Chambers felt that "deep focus," as he called it, would be useful in refining the notion of "stylistic variants," which he considered to comprise far too large a class of syntactic phenomena. In the terms presented earlier here, Chambers was interested in dividing (Sc+St) - equivalent classes into their (Sc+St+Sd) - equivalent subclasses. In part, this interest was motivated by psycholinguistic experiments, such as that of Tannenbaum and Williams (1968), which had supported the notion that active and passive sentences are not merely stylistic variants; the choice between them is motivated by the speaker's focus of attention.

Chambers proposed (p. 24) that "a feature [±FOCUS] be assigned by a very general rule of the base component to the matrices of categories at the level of deep structure." Passive sentences, then, would be focus variants of their corresponding active forms; this semantically significant distinction would be marked at the deep structure level. This is certainly an improvement over the contradictory stance adopted by Katz and Postal (1964), who opted for a passive marker in the deep structure, but felt nonetheless that an active sentence and its corresponding passive were meaning-equivalent.

Chambers thus proposed Rule 2 as an approximate version (p. 56) of the passive rule, suggesting that it should replace Rule 1, Chomsky's original formulation (Chambers, 1970, p. 47):

Rule 1. PSV (optional)

```
SD:  NP      AUX          V      NP
SC:  1        2           3      4   -->
     4   2+ be + en       3      by +1
```

Rule 2. PSV (obligatory)

```
SD:  NP      AUX          V    [ NP     ]
                                [+FOCUS ]
SC:  1        2           3      4        -->
     4   2+ be + en       3      by +1
```

Similarly, Chambers' tentative revision of dative movement is as follows (p. 60):

Rule 3. DATIVE (obligatory)

```
SD:  V  [  NP    ]     NP
        [+FOCUS ]
SC:  1      2           3    -->
     1      Ø         3+P+2
```

In Chambers' analysis, both obligatory rules are sensitive to the same feature specified in the deep structure. Thus, Chambers claimed (p. 65) that structure (23) below will result in (24) (with (25) blocked) if PSV is ordered before DATIVE, and (25) (with (24) blocked) if the ordering is reversed:

(23) Swift sent [Stella] a note.
              [+FOCUS]

(24) Stella was sent a note by Swift.

(25) Swift sent a note to Stella.

In order to get around this problem, Chambers proposed a
formal distinction between the [+FOCUS] specification which
results in passivization, and that which results in dative
movement. He suggested the feature [+TOPIC] to trigger
those permutations which prepose constituents, while
[+FOCUS] would then trigger only the transformations which
postpose constituents to the intonation centre.

Actually, however, applying Chambers' rules in the case
that PSV is ordered before DATIVE does not result in (24),
but rather (26):

(26) Stella was sent by Swift a note.

Chambers' rules, as stated, do not allow (24) to be derived;
similarly, (27) is blocked:

(27) A note was sent to Stella by Swift.

Therefore, Chambers' statement of PSV is inadequate for
dative sentences.

This, then, is a summary of Chambers' proposal for deep
focus. He claimed that his model has several advantages
over the surface focus model which Chomsky (1971) had
proposed. First, Chambers suggested that "the equivalence

of focus and intonation which is at the heart of the notion
of surface focus [pp. 32-33]" is undesirable. He claimed
that there is only one intonation centre in each sentence;
therefore, a theory adopting surface focus cannot deal with
sentences, such as (28) (Chambers, 1970, p. 33), which have
more than one occurrence of focus:

(28) MARIE gave the bird to CLYDE.

However, it is difficult to see how Chambers' model is an
improvement over the surface focus model with regard to this
problem. Neither theory makes the claim that contrastive
stress cannot produce more than one focused item in a
sentence. Both Chomsky's and Chambers' theories adopt a
one-to-one correspondence between focus and intonation
centre. However, both theories provide an awkward framework
for discussung contrastive stress (see Chapter Three).

That Chambers did consider focus to be related to the
surface structure phenomenon of intonation centre, and that
he, like Chomsky, based his development of focus on
sentences with normal intonation, is clearly indicated in
such statements as these (Chambers, pp. 25-26):

> Transformational rules which are sensitive to the
> feature [+FOCUS] turn out to involve primarily re-
> ordering of two sorts. The first preposes focused
> constituents to the subject noun phrase (NP) position
> in the surface structure, as in passivization. The
> other shifts focused constituents to the intonation
> centre of the sentence, as in dative movement and
> clefting.

Thus not only does Chambers' notion of deep focus have strong surface structure correlates, but also surface structure phenomena strongly motivated the theoretical development. In this regard, Chambers' treatment of dative movement is particularly interesting. It is clear from his statement of the DATIVE transformation (p. 60) that he considered the underlying structures to be those like (29a), while dative movement operates, if the indirect object is marked [+FOCUS], to produce sentences like (29b):

(29) (a) John gave Andrew the book.

(b) John gave the book to Andrew.

The only motivation for choosing (29a) as the underlying structure comes from surface focus considerations -- namely that focus and intonation centre coincide, and that intonation centre is determined by the stress rules mentioned in Chomsky and Halle (1968). Thus, Chambers' notion of deep focus appears to be motivated by surface structure considerations, as was Chomsky's notion of surface focus. The question arises, then, as to whether Chambers' improvements could be made within the framework of surface focus.

Chambers' second objection to surface focus is that the notion of "phrase containing the intonation centre" is an equivocal one, and hence is not useful in determining the focus. This may be a problem for Chomsky's theory, but it is not one which is solved by Chambers' proposals. Chambers

claimed that the following sentence (p. 34), under normal intonation, potentially has at least five focused phrases, as indicated by the parentheses:

(30) (¹did (²Marie (³give (⁴the bird (⁵to Clyde⁵) ⁴) ³) ²) ¹).

This consideration causes Chambers' analysis some difficulty, since his primary motivation for the split between [+TOPIC] and [+FOCUS] specifications was that the latter trigger transformations which bring constituents into focus by postposing to the intonation centre. However, if a focused item can be any phrase containing the intonation centre, then the focusing property of postposing is somewhat less convincing.

It is not even clear that this "multiplicity of surface focus [p. 35]" is necessarily a weak point of Chomsky's theory. It suggests that discourse analysis may be necessary in order to determine such phenomena as focus.

Chambers' third objection to surface focus is Lakoff's point, mentioned earlier, that some sentences which have distinct surface structure constituents appear not to have different focus possibilities. The particular example which Lakoff gave ((14), p. 43 above) involves particle movement. Chambers agreed with Lakoff that the focus possibilities of the two sentences are identical "since the contrast in surface constituent structures in [(14a)] and [(14b)] is

merely the result of particle movement [p. 38]." However, Chambers did not back up this claim that particle movement is semantically insignificant; therefore, his statement is unwarranted. Jackendoff (1972, p. 22, n. 2) in fact has suggested that sentences (14a) and (14b) do differ in focus possibilities, since the phrase "a girl whom he had once met in Chicago" is a constituent in (14a) but not in (14b):

> Thus the theory predicts that [(14a)] should be a more
> natural answer than [(14b)] to <u>Whom</u> <u>did</u> <u>John</u> <u>look</u> <u>up</u>?
> Insofar as my intuitions are applicable to this
> example, this prediction seems correct.

This argument may appear to be much weaker than that of Chambers. Both arguments, however, are based on intuitions. Jackendoff's intuitions in this matter are about individual sentences; Chambers' are about the general phenomenon of particle movement. It is to be hoped that experimental work will soon answer questions such as this, and put an end to the all-too-frequent publication of intuition-based arguments and counter-arguments for particular sample utterances.

The fourth objection which Chambers voiced against surface focus is that this model creates theoretical chaos by forcing abandonment of the Katz-Postal principle. This criticism is difficult to evaluate; it is not now so clear as it once seemed to be that a theory which allows the Katz-Postal principle is superior to a theory, accounting for similar phenomena, which forces the abandonment of this

principle. Assessing the strength of Chambers' argument
would involve an assessment of the relative merit of the
Standard Theory Model and all the models which have been
proposed as alternatives, not only with respect to the
question of focus phenomena, but several other issues as
well. Such an assessment is beyond the scope of the present
study.

Chambers' final objection to surface focus was that it
does not allow for a sentence to have no focused item,
because the "least-marked" case in a surface focus
interpretation is for everything to be in focus. That is,
if no particular phrase is in focus, and if focus is defined
to be a phrase containing the intonation centre, then the
whole sentence must be in focus. This is also Halliday's
view (p. 208); namely, "where the focus is unmarked,...its
domain may be the whole of the information unit." However,
in Chambers' theory, the assumption is made (p. 41) that
some sentences in fact have no focused item:

> ...deep focus assumes that for those deep structures
> which are ultimately transformed into declarative
> surface structures with normal intonation, focus is not
> a consideration in the semantic interpretation.

The surface focus view, then, is that every sentence
with unmarked focus has a reading in which the whole
sentence is focused. Chambers' objection to this view
(p. 41) is based on the "corollary assumption" that for such
a reading, "nothing is presupposed." His argument, however,

is based on the general notion of presupposition of existence, which appears to be far removed from any reasonable linguistic interpretation of the presupposition - focus framework. The term "presupposition" should perhaps be replaced, since it is often interpreted in the sense that "...the presuppositions of a sentence are those conditions that the world must meet in order for the sentence to make literal sense." This view of presupposition, expressed by Keenan (1971, p. 45), seems to be relatively independent of focus considerations. A better pair of terms than "presupposition - focus" would be Halliday's "given - new" information framework (1967, p. 204), where new information is new "in the sense that the speaker presents it as not being recoverable from the preceding discourse." Thus, Halliday asserted (p. 208) that a sentence with unmarked focus, in which the whole information unit may be in focus "...does not imply any preceding information, and this is in fact the form appropriate to the first information unit in a discourse." In linguistic theory, focus is considered to be a discourse phenomenon, but the use of the term "presupposition" has sometimes led to considerations beyond the level of a particular discourse.

The extent, then, to which Chambers' notion of deep focus is an improvement over surface focus cannot be assessed without addressing the following issues. First, Chomsky would claim that such a deep focus theory is merely a notational variant of surface focus (1971, p. 206).

Jackendoff (1972) would qualify this claim by noting its dependence on the assumption that transformations cannot introduce new nodes (p. 240), which he regarded as an open question. Secondly, in Chomsky's model, the focused constituent cannot always be determined from an isolated sentence, because of the imprecision of the notion of "phrase containing the intonation centre." In Chambers' model, the focused constituent of any isolated sentence is clearly defined without reference to the context; whether this represents an improvement is unclear. Further, in his theory, sentences with unmarked focus have no focused (new) items; the motivation for this change from Chomsky's or Halliday's theory, however, is based on an argument concerning presupposition of existence. Chambers further claimed that his model, but not Chomsky's, would account for those sentences in which two or more constituents are focused. Since such sentences generally involve instances of contrastive stress, this claim will be discussed in the following chapter.

CHAPTER THREE

CONTRASTIVE STRESS

Theoretical Treatment of Contrastive Stress

Within theories of transformational grammar,
contrastive stress is usually treated as a phonological
process, as are the phenomena of normal stress and
intonation. Various arguments have been advanced for either
a syntactic or a semantic component of contrastive stress.
In particular, the semantic aspects of contrastive stress
are of interest here. The serious attempts to incorporate a
model for contrastive stress into a transformational theory
of grammar have been recent. Three of these accounts --
Chambers (1970), Chafe (1970), and Jackendoff (1972) -- will
be discussed here. Some of the earlier accounts of
contrastive stress are first provided as background.

In Syntactic Structures, Chomsky (1957, p. 65)
discussed briefly the "heavy-stressed" auxiliary verb in
such sentences as "John does come." He suggested that such
sentences are transformationally derived from kernel
sentences, such as "John comes," by a transformation of
"affirmation." This is the only kind of stress which
Chomsky dealt with in Syntactic Structures. It is not

surprising that this type of construction was the one which
he happened to mention, because this kind of stress is
predictable from the surface structure, while other kinds
are not. In Chomsky (1971), contrastive stress was
discussed, although it was seen as involving "special
grammatical processes of a poorly understood sort [p. 199],"
which result in a shift in the intonation centre of the
sentence. Chomsky considered this shift to be semantically
significant, and perhaps of syntactic significance also. He
suggested (p. 204) that the focus and presupposition in
sentences with contrastive stress are determined from the
intonation centre, as they are in sentences with normal
intonation.

Another characterization of contrastive stress concerns
the work of Gleitman (1965) and Sanders (1968). In an
informal discussion of contrastive stress, Sanders claimed
that stress has greater significance than does the ordering
of constituents in a discourse. For example (pp. 55-56), he
considered question (1a) to be answered appropriately by
(1b), but not by (1c), which preserves the constituent order
of the question. Heavy stress is indicated by underlining:

(1) (a) Which boy (who is) standing in the corner is
         your brother?

     (b) The boy (who is) <u>wearing a dunce-cap</u> (who is)
         standing in the corner is my brother.

     (c) The boy (who is) <u>standing in the corner</u> (who
         is) wearing a dunce-cap is my brother.

From examples such as these, he concluded (p. 156, emphasis added):

> ...certain stressing laws, at least, have nothing whatever to do with superficial, or phonological, structures, and are probably universally defined for all languages simply in respect to the identity and non-identity of sub-strings of semantic and syntactic elements within the same discourse string. _The basic process here is simply the assignment of stress to the non-identical constituents of a pair of otherwise identical structures._

Sanders credited Gleitman (1965) with providing some necessary background discussion for the informal rule above. In a paper about conjunctions in English, Gleitman (p. 270) concluded that "stress is related to repetition." Sanders claimed that his stress rule (1968, p. 158) is a generalization of Gleitman's rule, and that it is simplified by the assumption that "sentential constituent ordering is logically subsequent to stressing." He argued (p. 159) that the simplified stress rule that he thereby obtained reflects:

> ...our intuitive understanding of linear order as something which is semantically irrelevant and as something which is imposed on sets of superficial constituents of sentences according to different and equally arbitrary rules for different languages.

For Sanders, then, transformations such as passivization and dative movement are semantically empty, while contrastive stress is significant. Secondly, he argued from his informal stress rule that contrastive stress can be considered as a syntactic process. Actual attempts to

express contrastive stress as a syntactic process, however, have been unconvincing (see below).

A more thorough treatment of contrastive stress is provided by Bolinger (1961, 1972). He made a distinction between contrastive accent and contrastive stress. Bolinger argued (1972, p. 633) that accent is independent of syntax, "directly reflecting the speaker's intent and only indirectly the syntax." Further, "accented words are points of information focus." Bolinger also emphasized the pitch component of accent. Contrastive stress, on the other hand, was seen (1961, pp. 116-17) as being "phonetically definable as a shift in stress, although one cannot predict with precision when, where, and how the shift will occur."

For Bolinger, then, contrastive stress is a shift of stress within a word for the purpose of contrasting that word with another phonetically similar one in the same utterance. The contrast is usually an explicit one, with both words appearing in the utterance. Thus, in (2) below, there is no contrastive stress. The words "report" and "broadcast," although they are spoken with increased pitch and volume, are normally stressed[1] (p. 107):

(2) I said to report the trouble, not broadcast it.

For Bolinger, contrastive stress occurs when such pairs of

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1. Bolinger represented pitch by vertical displacement. Here, however, the accented syllables are underlined.

words as "export" and "deport", or "hotel" and "motel" are
spoken, usually in the same utterance. Bolinger does allow
that in some cases this shift in stress may occur when only
one member of the pair is spoken. An example would be the
utterance, "I'd advise a motel in this city." In such
situations, "the speaker has the opposite member at the back
of his mind [1961, p. 108]."

Contrastive accent, in Bolinger's discussions, seems to
be defined as any intonation pattern which brings out a
contrast between two syntactically similar constituents in a
discourse. Two points are worthy of note here. First,
contrastive accent may occur in utterances which have normal
intonation. Secondly, the contrast is again an explicit
one; usually both of the similar constituents must be
present. Thus, for (2) above, Bolinger claimed that
"report" and "broadcast" are contrastively accented.

The lack of clarity in Bolinger's definition of
contrastive accent is illustrated by his comments regarding
the following sample discourse (1961, p. 106):

    (3)   (a) I found a book.

          (b) Whose book?

          (c) John's book.

          (d) Not Joe's?

His remark was this:

    ...there is no difference between whose, John's, and

> Joe's as far as accent or reasons for accent are
> concerned, but we are likely to limit the term
> contrastive to the word Joe's in the last sentence of
> the series.

Bolinger, then, did not view utterances as predictably containing either contrastive or non-contrastive accent, but rather as "more likely" or "less likely" to contain contrastive accent. In (3) above, he viewed (3d) as containing contrastive accent; here the intonation is normal, and both the contrasted items have been mentioned explicitly in the discourse.

Recently, Bolinger has suggested that, while accent is not in general predictable, clear tendencies toward certain intonation contours are sometimes found. This opinion surfaced in his reply (1972) to a suggestion by Bresnan (1972). She had proposed (1972, p. 340) that the questions (4) and (5) below can be distinguished in the following way. Sentence (4) occurs as the opening of a discourse; (5), however, requires a prior context such as "We should take one of these turns," and is used "to elicit latent or withheld information":

(4) Which turn should we take?

(5) Which turn should we take?

Bolinger regarded this distinction between initiatory and elicitory questions to be poorly motivated, and stated (p. 642) that "what is involved is the de-accenting of repeated elements and the accenting of new elements, which

is to be found everywhere."

This remark of Bolinger's is similar to the rule proposed by Gleitman (1965) and Sanders (1968). However, both Gleitman and Sanders tried to account for accent directly in terms of syntax, and their rule is intended to be exceptionless. Bolinger, on the other hand, observed (p. 644) that only tendencies toward certain stress patterns could be discussed in terms of syntax:

> The distribution of sentence accents is not determined by syntactic structure but by semantic and emotional highlighting. Syntax is relevant indirectly in that some structures are more likely to be highlighted than others. But a description along these lines can only be in statistical terms.

According to Bolinger, if the partly identical structures are phonetically similar words, then the stressing of the non-identical parts is considerably more likely than is the accenting of non-identical parts when the partly identical structures are semantically similar words, or larger constituents. In the latter case, there are more possibilities for the intonation pattern, with the result that each choice has a lower probability of occurring.

The distinction between contrastive stress and contrastive accent will not in general be maintained in the following discussion, since the TGG theories use the term "contrastive stress" in both senses. However, in the present experiment, which is introduced in Chapter Five, the use of "contrastive stress" is restricted to Bolinger's

notion of contrastive accent. The stress variants in the experiment thus reflect semantic highlighting. Contrastive stress, when it is regarded as phonologically distinct from normal stress, will be represented by capitalization throughout the remainder of the discussion.

Bresnan's (1972) views on stress and syntax deserve some mention; it was mainly her proposals concerning the Nuclear Stress Rule of Chomsky and Halle (1968) that caused Bolinger to complain about current attempts to account for accent in terms of syntax. She summarized her position (p. 341) by stating that:

> ...because elicitory questions [e.g.(4b) above] depend
> upon special non-grammatical contexts, they are a
> counter-example to any purely grammatical theory. This
> is also true of contrastive and emphatic intonation
> (e.g.,This IS my answer; He wasn't REjected; he was
> DEjected.) The most reasonable conclusion is not that
> a structural theory of intonation is impossible, but
> that it must be restricted to those phenomena which are
> indeed structure-dependent.

For Bresnan, then, "grammar" is limited to syntax. The "non-grammatical contexts" which she mentioned are discourse phenomena, which, as discussed in Chapter Two, are an important consideration in the theories of grammar of Jackendoff and Chafe, and are mentioned by Lakoff. She is correct if, by her first statement quoted above, she meant that a formal syntactic treatment of discourse phenomena, such as that undertaken by Chambers, has been elusive. She is probably quite right, too, in being wary of a formal syntactic treatment of contrastive stress.

Attempts to incorporate contrastive stress into the syntactic component of a grammar have not been satisfactory. In the following two sections, the contributions of Chambers (1970) and Jackendoff (1972) will be discussed. This is followed by a discussion of Chafe's account of contrastive stress within his theoretical model.

A Deep Structure Approach: Chambers

On intuitive grounds, Chambers (1970) stated that contrastive stress places more emphasis on constituents than does either passivization or dative movement. He emphasized the syntactic aspects of contrastive stress; citing an article by Fischer, who provided syntactic evidence for relating cleft sentences and contrastive stress, Chambers treated the two processes as being related, and called them both hyperfocus devices.

Chambers proposed that a marker be present in the deep structure which would, like the markers for passivization and dative movement, trigger an obligatory rule (p. 125):

> ...I consider the hyperfocus devices to be triggered by
> a set of features which always includes [+FOCUS] or
> [+TOPIC] as one member. The additional, or hyperfocus,
> feature is arbitrarily written as [+FILL].

This proposal appears to have been made with only dislocations and cleft sentences in mind. Chambers went on to describe how all the cleft structures and dislocations can be derived by various combinations of [+TOPIC],

[+FOCUS], and [+FILL]. He did not provide a similar discussion for contrastive stress. There are several problems with the analysis; for example, Chambers' attempts to integrate his treatment of contrastive stress with his proposals for dative movement were inadequate.

The dative movement rule, as stated by Chambers (p. 56), transforms (6a) into (6b) below:

(6)   (a) The farmer gave John a Clydesdale.

(b) The farmer gave a Clydesdale to John.

There is no provision in Chambers' model for contrastively stressing the direct object, because this noun phrase is never specified as [+FOCUS] or [+TOPIC]. Thus, (7) below is not accounted for:

(7) The farmer gave John a CLYDESDALE.

Secondly, since dative movement is obligatory in Chambers' analysis, it will either always be triggered or always not be triggered by the features [+FOCUS, +FILL] on the NP John in (6a) above. If it is triggered, then it is not clear how to produce sentence (8) since, in order to receive contrastive stress, John must be specified [+FOCUS].

(8) The farmer gave JOHN a Clydesdale.

Similarly, if dative movement is not triggered by [+FOCUS, +FILL], then the derivation of (9) is unclear:

(9) The farmer gave a Clydesdale to JOHN.

In Chambers' model, then, contrastive stress is not successfully likened to clefting. Further, no suitable treatment is given for contrastive stress. Chambers' claim, mentioned in an earlier section, that his model will account for sentences that have more than one focused item, is based on his inadequate discussion of contrastive stress.

Emphasizing the syntactic aspect of contrastive stress appears not to have been successful in general. Chambers discussed two other such attempts, one of them from an unpublished paper. The present discussion is based on Chambers' accounts of the proposals. The unpublished proposal, due to Fischer, is that "contrastive stress and cleft sentences are two surface structure reflections of the same deep structure fact [Chambers, 1970, p. 128]." The evidence to support this proposal consisted of Fischer's intuitive observation that both contrastive stress and clefting limit the scope of negation, questions, and movable adverbs. Regarding the scope of questions, Chambers argued that (10) and (11) below share the presupposition that John's daughter has a new bike; both question only whether it was John who bought it (p. 127):

(10) Did JOHN buy a new bike for his daughter?
(11) Was it John who bought a new bike for his daughter?

This intuition-based argument is unclear.

Chambers (p. 147) discussed a second proposal, due to Saltarelli, that contrastive stress be derived "as a syntactic process from underlying propositions and their complements." According to Chambers, (12a) is derived from (12b):

(12) (a) Haj is too BIG to climb over.

    (b) Haj is too big to climb over something, not
        Haj is too big for something to climb over.

In Saltarelli's proposal (1970, pp. 243-44), however, only the simple sentence "John built the house," and its stress variants, were discussed. Thus, he did not mention complement structures such as the one in (12b). One problem with Saltarelli's proposal, then, is that he did not state any constraints on the structures which can be invoked as complements. It is not clear that the complements in (12b) and (13b) are useful.

Chambers believed that (12a) is semantically distinct from (13a) which he saw as being derived from (13b):

(13) (a) Haj is too big to CLIMB over.

    (b) Haj is too big for something to climb over,
        not Haj is too big to climb over something.

Presumably, then, (14a) is grammatical according to Chambers' interpretation of Saltarelli's proposal, but (14b) is ungrammatical:

(14) (a) Mount Rundle is too big to CLIMB over.

(b) Mount Rundle is too BIG to climb over.

The semantic distinction which Chambers proposed is unclear. The main insight of Saltarelli's proposal, then, is that contrastive stress provides "implicit affirmations of some alternative [Chambers, p. 148]." The problem arises in trying to specify the alternative at the sentence level, rather than at the discourse level.

A Surface Structure Approach: Jackendoff

In Jackendoff (1972), stress and intonation were considered to be phonological phenomena with semantic effects, which he attempted to specify within a surface structure framework. He defined focus itself in semantic terms (p. 230); focus denotes "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer," while presupposition denotes the information which is assumed to be shared. However, Jackendoff argued (p. 230), as did Chomsky (1971), that "the focus is determined by the surface structure, as a phrase containing the main stress of the sentence." This approach, while it differs somewhat from that of Chambers (1970), still emphasizes syntactic properties as the defining characteristics of focusing. For this reason, Jackendoff's approach does not deal well with contrastive stress.

In general, contrastive stress is not easily discussed

in the surface structure models for focus devices.

Jackendoff noted (p. 234), as did Chambers (1970) and

Chomsky (1971), "that emphatic stress occurring anywhere in

a sentence attracts the focus." With this property of

contrastive stress in mind, Jackendoff noted that some

phrases which contain the intonation centre cannot be

focused. For example (p. 234), in (15) below, the VP

contains the intonation centre, but cannot be the focus:

    (15) Did Fred HIT Bill?

Only the verb "hit" can be the focus; this dependence of

stress position on the focus is stated in the following

condition (p. 237):

> If a phrase P is chosen as the focus of a sentence S,
> the highest stress in S will be on the syllable of P
> that is assigned highest stress by the regular stress
> rules.

This principle certainly incorporates contrastive stress

better than did Chomsky's original definition of focus,

which was restricted to normal intonation. It is necessary

to note, however, that "phrase" in the above statement can

refer, for example, to the single word "hit" in sentence

(15). This use of the term "phrase" allowed Jackendoff to

include contrastive stress in his focus theory.

    Jackendoff proposed that a syntactic marker F be

associated with a node in the surface structure of every

sentence. The semantic and phonological components would

then make use of the marker F. One rule in the semantic
component, for example, would be a version of the following
focus assignment rule (p. 240):

> The semantic material associated with surface structure
> nodes dominated by F is the Focus of the sentence. To
> derive the presupposition, substitute appropriate
> semantic variables for the focused material.

The marker F must thus occur in every sentence. As an
approximation to the phonological realization of F,
Jackendoff proposed that emphatic stress be assigned to the
main stress of the F constituent. He adopted the convention
that emphatic stress does not weaken on successive cycles,
unlike other stresses. He then noted (p. 242):

> Thus in the assignment of stress contour, the main
> stress of the constituent marked F will receive
> emphatic stress and all other stresses will have the
> values assigned by Chomsky and Halle's rules.

According to Jackendoff's proposal, the following sentences
are indistinguishable, since in each case the final lexical
item belongs to the constituent marked F and receives the
main stress. In both (16a) and (16b), then, "Andrew" is
assigned emphatic stress by Jackendoff's proposed rules.

(16) (a) John gave the book to Andrew.

(b) John gave the book to ANDREW.

Jackendoff did suggest refining his proposal along the lines
that all stresses dominated by F be exempted from weakening
on successive cycles. However, he concluded (p. 242) that

"as judgments on stress become unreliable beyond a certain point ... I would hesitate to propose much beyond this point without thorough experimental work."

One further aspect of Jackendoff's model provides an interesting contrast to the syntax-based focus in Chambers' model. Jackendoff argued that the notion of semantic variables to be substituted for the focus in forming the presupposition has a nonsyntactic basis. The following is an example of an appropriate question-response pair (p. 243):

(17) (a) Did the cop ARREST Bill?

(b) No, he only LEERED at him.

The focus of (17a) is a transitive verb; that of (17b) is intransitive. Jackendoff concluded (p. 244) that "syntactic similarity is not a necessary condition for possible contrast." To show that it is also not a sufficient condition, he gave the following example (p. 244):

(18) (a) Did Fred turn the lights ON?

(b) No, he turned them OFF.

(19) (a) Did Fred turn the proposal IN?

(b) No, he turned it OUT.

Jackendoff claimed that (19b) is unacceptable. Thus, the sentence pairs (18) and (19) have similar syntactic structure, but the contrast between the particles is possible, according to Jackendoff, only in (18).

Jackendoff concluded (pp. 244-45) that:

> ...the semantic variable in the focus assignment rule
> must be assigned with respect to the semantic
> interpretation of the sentence, disregarding the
> syntax, in particular the deep structure.

Jackendoff's position, in disregarding the syntax when
treating focus, is thus diametrically opposed to Chambers'
claim that focus is obligatorily marked in deep structure.

A Semantic Approach: Chafe

Chafe's discussion (1970) of contrastive stress is
brief. Because he considered the verb to be the central
semantic unit, he defined a contrastive sentence as being
one in which an inflectional unit contrastive is added to
the verb. In the presence of a contrastive verb, the
regular rules for determining what elements in the sentence
are new do not apply, and any element may be marked new.
Such an item is then focused on. In his view (p. 224),
then:

> ... a contrastive sentence conveys the information that
> the new semantic unit within it has been selected by
> the speaker from various implied alternatives as the
> correct one ...

Chafe (p. 225) viewed the contrastive sentence (20)[1], a
possible answer to (21) below, as homonymous with the

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1. As in Chafe's sample sentences which are quoted in
Chapter Two, underlining indicates high pitch and strong
stress, which may or may not be contrastive.

sentence with normal stress which answers the question (22):

(20) David emptied the box.

(21) Did David empty the box or the suitcase?

(22) What did David do?

The answer to (22), however, has the "unmarked" distribution of old and new information; that is, the verb root and the patient noun root are new. The contrastive reading of sentence (20) has the marked distribution in which only the patient noun root is new. Thus, in Chafe's model, the distribution of old and new information does not have clear phonological correlates.

Chafe (p. 226) noted that, in his model, the noncontrastive reading of sentence (20) has the same distribution of information as the contrastive sentence (23):

(23) David emptied the box.

He noted that the notion "new information" might need to be refined (p. 224):

In a contrastive sentence, new means that the choice of the unit to which it is attached (rather than some other possible choice) is being presented by the speaker as new information.

Contrastive sentences, he suggested, might contain a specification labelled focus, rather than the specification new.

The importance of contrastive stress in Chafe's theory is illustrated by the following sentences:

(24) (a) What did David give (to) Lisa?

(b) David gave <u>Lisa</u> <u>a</u> <u>picture</u>.   (normal stress)

(c) David gave Lisa a <u>picture</u>.   (contrastive)

It is evident from Chafe's discussion that the contrastive sentence (24c) is acceptable as an answer to (24a), while (24b) is unacceptable. If only one NP in a dative sentence carries new information, that NP must be contrastively stressed.

Several theories of focus have been discussed in the last two chapters. In the following chapter, consideration is given to experimental treatment of focus. Some published experiments are assessed with respect to their contributions toward a theory of focus. Predictions based on the theories are also considered, in an attempt to clarify some of the issues which must be dealt with in further experimental work in the area of focus.

CHAPTER FOUR

EXPERIMENTAL TREATMENT OF FOCUS

Experiments Concerning Passivization

The more complete theoretical accounts of focus
discussed in the previous chapters share the property of
being very recent. For this reason, experimental literature
in this area has had insufficient time to emerge. However,
there have been several published experiments con-
cerning the nature of passivization, a transformation
which has here been treated as a syntactic reflex of focus.
Some of the experimental literature on passivization is of
interest here, although it must be remembered that the
purpose of these experiments was not expressed in terms of
the overall theories of focus which have been discussed in
the preceding chapters.

Tannenbaum and Williams (1968) anticipated the current
concern with semantics of discourse (Fletcher, 1973) and
with treating passivization as a focus phenomenon (Chambers,
1970). They attempted to place what they called "conceptual
focus" on either the actor subject or the acted-upon object
in a simple situation and to assess the effects of such
control on their subjects' "readiness to describe the

situation in active or passive sentence forms," as measured by response latency. The authors did not define conceptual focus, but used it in their report as a synonym for "focus of attention" and "emphasis."

Their experimental procedure was to present a line drawing of a situation, such as a train hitting a car, together with a request for the subject to describe the situation in either an active or a passive sentence. The dependent variable was response latency, measured from the time the picture was presented until the subject's response was completed.

Conceptual focus was manipulated by presenting a preamble which centered on the subject or object (e.g., the train or the car), or a control preamble which focused on neither. Each preamble, which the subject read out loud, consisted of six sentences. A second variable in the preambles was the use of active or passive voice. Thus, there were six forms of preamble. A typical subject-focus, active-voice preamble was the following (p. 247):

> The Train -- Trains provide an efficient means of transportation for the traveler. First, a train eliminates the problem of traffic jams. [Etc.]

Other subjects, before seeing the same picture, read the corresponding preamble with subject-focus, passive-voice ("The Train -- An efficient means of transportation is provided by trains..."), with object-focus, active-voice

("The Car -- only people living in the richest countries use the car widely..."), with object-focus, passive voice ("The Car -- The car is used widely only by people living in the richest countries. Cars are driven in this country by as many women as men..."), or with a neutral focus, in either the active or passive voice.

The results showed a highly significant (p<.01) interaction between preamble focus and response latency, but no significant interaction between preamble voice and response latency (p>.10). Thus, the authors concluded (p. 249) that "the results do indicate a decided effect of the conceptual-focus manipulation upon readiness to encode in active and passive forms." Further, "there is a functional distinction between [active and passive sentence forms] stemming from different demand characteristics of the encoding situation."

Tannenbaum and Williams, then, approached passivization as being related to focus of attention, with some measure of success. Their notion of focus is not based on the "intonation centre" definition of Chomsky or Chambers, or on Chafe's "new information" definition. Rather, "focus of attention" in this experiment seems to be more closely aligned with the definitions of "theme" (Halliday), "topic" (Chambers), or "old information" (Chafe). What this experiment showed is that it is easier to produce a sentence of a given voice if the first noun phrase is the same as the

focus of attention in the preceding discourse than if a later noun phrase is the focus of attention. In some sense then, it can be said that the notion "topic of a sentence," identified as the first noun phrase, has some psychological significance. The experiment has nothing to say about the psychological role of the "focused" elements of a sentence, defined by the linguists as new information and identified by intonational prominence. The experiment nonetheless represents a useful step toward understanding the nature of the semantic correlates of the active/passive distinction.

Johnson-Laird (1968b) also accepted the idea that the role of the passive is one of emphasis. His experiment was designed to test the nature of this emphasis on the logical object -- whether it was due to the object becoming the grammatical subject, or simply, as Johnson-Laird believed, to its being placed before the logical subject. For the experimental task, each subject was shown a pair of long narrow rectangles, one divided symmetrically and the other asymmetrically into two coloured areas. The subject was also presented with a set of four sentences, such as (1) below (1968b, p. 8). Each of these sentences correctly described the arrangement of colours in the rectangles:

(1) (a) There is a blue area that precedes a red area.
         (Normal active)

     (b) There is a red area that a blue area precedes.
         (Inverted active)

     (c) There is a red area that is preceded by a blue
         area. (Normal passive)

(d) There is a blue area that a red area is
    preceded by. (Inverted passive)

The subjects' task was to rank-order the four sentences

according to their appropriateness in describing one

stimulus of the pair as opposed to the other.

The resulting four groups, as coded and identified by

Johnson-Laird (1968b, p. 9) were:

    AO: the asymmetrical stimulus had to be described and
        its larger area [red, in (1)] was denoted by the
        logical object.

    AS: the asymmetrical stimulus had to be described and
        its larger area [blue, in (1)] was denoted by the
        logical subject.

    SO: the symmetrical stimulus had to be described and
        the larger area of the asymmetrical stimulus [red,
        in (1)] was denoted by the logical object.

    SS: the symmetrical stimulus had to be described and
        the larger area of the asymmetrical stimulus
        [blue, in (1)] was denoted by the logical subject.

Johnson-Laird predicted that for the AO group, the first

choice would be the normal passive, followed by the inverted

active. This was expected because, according to Johnson-

Laird (p. 10), both the normal passive and inverted active

bring the logical object "to the front of the sentence,"

while the passive, by virtue of its markedness, is the more

emphatic form. For similar reasons, the first and second

choices for the AS group were predicted to be the inverted

passive and normal active, respectively.

Although thirty-two subjects were involved in the

experiment, there were only two subjects in each of the
sixteen sentence set - picture groups, since each subject
did the experimental task only once. The data, analyzed by
employing rank order correlations and coefficients of
concordance, indicated that there was significant agreement
among subjects for the AO and AS groups. By graphing the
data, Johnson-Laird observed that the subjects' responses
were in agreement with the experimental predictions. Thus,
he concluded (pp. 13-14):

> The passive, as hypothesized, is more emphatic than the
> active ... It is word order that indicates to what the
> emphasis is being given ... Word-order alone however,
> is insufficient to account for the results since it
> fails to explain the preference for the passive rather
> than the active. The results support both the voice
> factor and the word-order factor ...

The experimenter did not discuss the relative importance of
word-order and voice in emphasizing one noun phrase or the
other.

It is questionable, however, whether this experiment
throws any light on the nature of the passive sentence form.
The sentences used in the experiment were not simple actives
and passives. Instead, the sentences involved an embedding;
it was only in the embedded sentence that voice varied.
According to linguistic theory (Katz & Postal, 1964, p. 73),
sentence (1a) is derived from the following underlying
structures by an embedding transformation:

    (2) (a) There is a blue area.

(b) A blue area precedes a red area.

Thus, (2a) is the matrix sentence, and (2b) the embedded structure. The semantic correlates of such embeddings are not known. As long as the embedding transformation has semantic significance, however, the results of this experiment cannot be assumed to hold for the simple passive transformation. There has been no attempt in the experimental literature to investigate the significance of the "there is" construction. Chambers (1970, p. 27) suggested that such a construction has semantic significance, since he considered such sentences as (1a) and (1b) to be focus variants.

Although Chambers did not develop this idea, it seems reasonable to suggest that the "there is" construction is of semantic significance, perhaps in much the same way that clefted sentences provide focus variants of their corresponding simple structures. If one can assume that the "there is" construction is similar in nature to clefting, then it is useful to consider the results obtained in Fletcher's study (1973). Half of Fletcher's subjects considered only the features of the superordinate sentence relevant in choosing appropriate answers from a P1-equivalent set to a given question. In locating appropriate descriptions for a picture, also from a P1-equivalent set, Johnson-Laird's subjects may well have reverted to the same strategy.

Clearly, then, the technique which Johnson-Laird chose was unsuitable as a way of investigating the nature of the emphasis which the passive form is supposed to put on the logical object. If the statistical design had been more substantial, then this experiment might have been comparable to Fletcher's. That is, Johnson-Laird was actually investigating paraphrase relations for a particular syntactically well-defined subset of English sentences. While it may be correct to regard the purpose of passivization as a reshuffling of emphasis, this experiment is unable to shed any light on which of the two co-occurring syntactic reflexes of passivization is the more significant.

Another experiment concerning the possible role of the grammatical subject as a conceptual and attentional focus was reported by James (1972). He made a distinction between speaker emphasis and listener focus. While he did not question the results of the experiments of Johnson-Laird (1968), and Tannenbaum and Williams (1968) concerning evidence that the speaker places the word to be emphasized in the subject position, he did question the extension of such evidence to arguments that the listener takes the grammatical subject as a conceptual focus. Such arguments are based on data from free recall experiments involving active and passive sentences with transitive verbs (e.g., Clark, 1966), which generally indicate that surface structure subjects are recalled more often than surface structure objects.

It is the free recall experiments that James objected
to; he suggested that there are inherent recall differences
between subject and object nouns which must be controlled in
any experiment. Considering evidence that transitive verbs
are more likely to take an animate subject than an animate
object, that only inanimate nouns may be abstract, and that
concrete nouns are easier to recall than abstract ones,
James concluded that, for randomly selected sentences, the
subject noun stands a better chance of being recalled,
regardless of its syntactic function.

His experiment, therefore, involved varying the imagery
value of subjects and objects for active and passive
sentences. Examples of his sentences (p. 206), with imagery
values of subject and object indicated in parentheses, are:

> (3)   (a) The library sold the piano.   (high-high)
>
>   (b) The policeman prevented the nonsense.   (high-low)
>
>   (c) The explanation satisfied the photographer. (low-high)
>
>   (d) The event undermined the economy.   (low-low)

For the active sentences, James found no significant
difference between the number of subjects and objects
recalled, contrary to the findings of earlier memory
experiments. The subject-object difference was not
significant when both were of low or high imagery value.
For high-low sentences, significantly more subjects than

objects were recalled, consistent with findings of the
earlier experiments, which had inadvertently used only
sentences of this type. No significant difference occurred
in low-high sentences, although James had expected a higher
object recall. Similar results were obtained for passive
sentences except in the low-high sentences, where the
subject-object difference was significant (p<.01). James'
conclusion, a reasonable one, was that theme or focus of
attention, an important concept for both speaker and
listener, is likely determined by nonsyntactic factors and
may not be common to both speaker and listener.

James' experiment, aside from being interesting in its
own right, supports some of the important observations by
Fillenbaum (1970) concerning memory experiments. Fillenbaum
questioned the validity of drawing inferences about
underlying syntactic structures on the basis of memory
tasks. His example was the experiment by Clifton and Odom
(1966) in which confusions among sentence types were
observed in a recognition task. Clifton and Odom had
suggested, on the basis of their experiment, that
affirmative and negative questions were essentially
synonymous. Using the more direct methods of paraphrase,
equivalence judgments, and prediction of speaker
expectations, Fillenbaum found differences between these two
sentence types. In the paraphrase task, for example,
changes in voice were much more frequent (65% as opposed to
19%) than changes from affirmative to negative or

conversely.

Fillenbaum suggested that the kind of analysis required of the subject in a memory task is different from that required for full understanding of the sentence. The latter task, Fillenbaum noted (p. 235), requires "a relatively full syntactic and semantic analysis which is sensitive to nuances in meaning and to possible differences in meaning."

Secondly, Fillenbaum observed (p. 231) that the data from memory tasks "provide information simultaneously about possible underlying structures and about memorial and retrieval processes; generally it will not be possible to factor this information into its components." This observation is aptly demonstrated in James' experiment. The role of imagery in memory processes had been ignored in previous experiments. James brought that problem to light, but there could equally well be other aspects of memory processes which are still being ignored in current psycholinguistic experiments.

With regard to Fillenbaum's first observation, it is interesting to note that James' experiment, while it appears to be reasonable, does come to the conclusion that there are no significant differences in the number of recalled subject and object nouns. Perhaps, if Fillenbaum is correct, the memory task is not sensitive enough to pick up such differences. Because of the complexity of memory tasks, and their possible blurring of fine differences in meaning,

then, other methods seem more appropriate at this time in the investigation of theme, or of focus in general.

Grieve and Wales (1973) varied not only sentence voice but also the definiteness of the sentence NP's in an attempt to study the effect of passivization on the relative importance of the sentence constituents. They presented subjects with thirty-two simple sentences which varied systematically according to voice and definiteness. Subjects were instructed to consider each sentence as the answer to a question, and they were asked to supply the appropriate question. Grieve and Wales hypothesized that the effect of definiteness would predominate over the effect of voice for this task. Their prediction was that the subjects would tend to include the definite NP in the questions which they constructed, and to leave out the indefinite NP. For the stimulus sentence "The boy hit a girl," then, Grieve and Wales predicted that the subjects would tend to supply the question "What did the boy do?"

The results, as analyzed by a chi-square statistic, did fit the predictions based on definiteness more closely than predictions based on word order. In interpreting their results, however, the authors assumed that the NP which the subjects specified in their question is the most important NP, although this assumption is unjustified. They concluded (p. 173):

...it would seem that the important entity of an

> utterance is not solely indicated by voice and word
> order, but is more closely concerned with definiteness.

A more reasonable interpretation of the results would be
within the framework of given and new information. Thus,
the results indicate that the given information or topic in
the sentence is more closely correlated with definiteness
than with word order. This was the approach taken by Grieve
(1973), although he did not question the interpretation of
the results in the Grieve and Wales paper.

Klenbort and Anisfeld (1974, p. 190) recognized that
the grammatical subject and grammatical object of a sentence
may both be prominent, in different senses:

> The grammatical subject is important as the theme of
> the sentence and the grammatical object as the focus of
> the sentential assertion.

They noted that the prominence of the grammatical subject
had been demonstrated in earlier psycholinguistic
experiments; the aim of their own experiment was to
investigate "the focal function of the grammatical object
[p. 190]." They used Chomsky's definition of focus (1971),
but restricted it to the NP at the end of the sentence.
They referred to the first NP as the presuppositional
phrase.

The following prediction underlies their experiment.
In a passive sentence, when some part of the information is
denied, for example by embedding the sentence in the context

"I thought ...but I was mistaken", the focal phrase of the
original passive is more likely to be interpreted as
mistaken information than is the presuppositional phrase.
For active sentences, they predicted that the focal and
presuppositional phrases were equally likely to be
interpreted as the mistaken part of the information.

Subjects were given, in written form, an active or a
passive sentence in which some part of the information was
denied, either by an embedding such as the one above, or by
a simple negative sentence. They were also given two
alternative sentences, one of which denied the involvement
of the logical subject (LS) in the sentential proposition,
while the other denied the involvement of the logical object
(LO). For example, subjects were given either (4a) or (4b)
below, together with LS and LO:

(4) (a) Fran didn't recount the gossip to Ruth.

(b) The gossip wasn't recounted to Ruth by Fran.

LO: Fran recounted the gossip to someone else; Ruth
doesn't know it.

LS: Someone else recounted the gossip to Ruth; she
knows it anyway.

Subjects were asked to "determine which of the two choices
[LO or LS] is more congruent with the initial sentence
[p. 193]."

The experimental predictions were supported by a t-test
on the mean number of choices for the two alternatives as a

function of voice. The authors concluded (p. 194) that the agent in the passive is "the focus of the assertion."

The statistical analysis of the data, as reported, was inadequate. An analysis of variance would have been preferable to a t-test, since the denial of information in the experimental sentences was accomplished in two distinct ways, either by an embedding or by a simple negation. This variable was not investigated. Thus, the conclusion that the agent in the passive is "the focal point of the information asserted by the sentence [p. 189]," might well be justified only for passive negative sentences.

Other Possible Focus Devices

The above experiments are typical of the existing literature regarding focus devices. In particular, they illustrate the limited scope of such experimental work; to date, passivization alone among the possible syntactic reflexes of focus has been investigated. Concern in these experiments has often been centered on the changes in grammatical subject and word order which are brought about by passivization. This interest is clearly shown in James (1972), and Johnson-Laird (1968b).

Passivization is not, however, the only syntactic phenomenon which is amenable to investigation as a focus device. Several other possibilities were discussed by Chambers (1970); in particular, he regarded the following

sentence pairs as focus variants (p. 27):

    (5)   (a) Murray gave Selma the ring.
           (b) Murray gave the ring to Selma.

    (6)   (a) Many toys are in the box.
           (b) There are many toys in the box.

    (7)   (a) Chris hit who with the lunch pail?
           (b) Who did Chris hit with the lunch pail?

    (8)   (a) It seems that John is a fool.
           (b) John seems to be a fool.

In addition, Chambers viewed the processes of dislocation, clefting, and contrastive stress as focus devices (p. 125):

    (9)   (a) Zeus, he hit Xeno.

           (b) It was Zeus who hit Xeno.

           (c) ZEUS hit Xeno.

Such processes have not been thoroughly investigated experimentally; as mentioned earlier, most of the experimental work on focus concerns just one of its syntactic reflexes, namely passivization.

Of the above processes, which are not intended to represent a complete list of focus devices, (6) occurs in the literature in the experiment by Johnson-Laird (1968b) which was previously cited. However, the focusing properties of the "there is" construction were not acknowledged by Johnson-Laird, who claimed to be investigating passivization. As a result, that particular experiment was somewhat uninformative. Secondly, sentences of the type (9b) were investigated by Fletcher (1973); his

experiment brought to light some interesting focus properties of clefted sentences. Otherwise, however, these processes have not been investigated.

The focus processes of interest in the present study are passivization, dative movement, and contrastive stress. These three were chosen because they can all occur in a single sentence; their interaction, therefore, can be studied and may provide additional information about the nature of focus, and the relative impact of different focus devices.

Some Empirical Questions

A comparison of the theories of focus -- in particular, of the more thorough theories of Jackendoff (1972), Chambers (1970), and Chafe (1970) -- has revealed some interesting empirical questions. The predictions of these theories concerning the nature of passivization, dative movement, and contrastive stress are of interest to the present study.

First, although passivization has often been investigated, its semantic significance as a focus device is still at issue. Chambers claimed that passivization increases the prominence of an object NP by front-shifting it. The psychological validity of this proposal, as well as that of Chafe's suggestion that the back-shifted agent NP is also focused, requires further investigation.

The passive sentence form has been widely regarded in the theoretical literature as a syntactically marked form of the active sentence in English. This is true, for example, of all the theoretical accounts discussed in Chapter Two. In addition, the passive form is regarded by some linguists as being marked in a focus sense. Chambers (1970) proposed that the marker [+TOPIC] occur in the feature matrix of certain NP's at the deep structure level. Such a marker would then trigger passivization. Johnson-Laird claimed experimental support from two of his studies (1968a, 1968b) for the hypothesis that "the passive implies that the logical object is more important than the logical subject, whereas the active implies that there is a minimal difference in the importance of these two entities or that the logical subject slightly predominates [1968b, p. 7]."

Thus, in some sense, both Chambers and Johnson-Laird considered a passive sentence to be marked with respect to focus, while its corresponding active is not. Chafe (1970) considered the passive form to be semantically distinct in focus properties from the active; however, in his model, the passive does not involve a "marked" distribution of information. For Chafe, the passive is not a more focused form than the active. Instead, passivization simply redistributes the NP's so that different ones are focused as new information.

A common formulation of the passive rule is that stated

by Chambers (1970, p. 47):

PSV (optional)

SD: NP   AUX   V   NP

SC: 1   2   3   4 -->

        4   2+be+en 3   by+1

As discussed in Chapter Two, this formulation is inadequate for dative sentences; a more general form of the rule, based on the formulation given by Thomas and Kintgen (1974, p. 175), is this:

PSV (optional)

SD: NP^1 AUX   V NP^2 Y

SC: 1   2   3   4   5 -->

        4   2+be+en 3 $\emptyset$ 5+by+1

For dative sentences, Y includes the second object NP. According to this formulation, the passive transformation orders the agent NP last in the sentence, but does not affect the order of the other NP's, relative to each other.

The significance of the dative movement transformation as a focus device is also at issue. Dative movement has been of less theoretical interest than passivization; moreover, its treatment, even though scant, is not unified. Even the underlying form is not agreed upon. Chambers (1970) reported formal arguments from the literature for both forms. Fillmore (1965) arbitrarily selected the form

(10a) as base form, while Emonds (1972) chose (10b).
Syntactic evidence in support of either form as basic is
lacking; Chambers' own choice, (10a), was equally arbitrary,
but fits in with the intonation view of focus.

(10) (a) John gave Andrew the book.

(b) John gave the book to Andrew.

Jackendoff chose (10b) as the underlying form, on the
grounds that the NP-PP structure is common in English, while
PP-NP is rare.

Dative movement is not usually likened to passiviza-
tion; it is a strong point of Chambers' theory that the two
processes are viewed as similar. The similar function of
both rules is to permute NP's; this useful observation is
readily made in a focus context, although even from this
point of view it is not always noticed. Whether the
permutation of NP's which occurs in dative movement has a
similar focusing effect to the re-ordering in passivization
is not known. In Chambers' proposal, dative movement and
passivization are treated as if they had similar focus
effects. Chafe, though, considered dative movement to have
no focus effect unless it occurs with passive verbs. It is
surprising that Chafe did not view dative movement as
semantically significant in general, since he has stated
(1971, p. 11) that "the notion that language is full of
paraphrases, in the sense of different surface structures
which reflect the same semantic structure, is mistaken."

Chambers' treatment of dative movement as similar to passivization is preferred here to Chafe's more complicated and less insightful analysis. Chambers' more detailed assessment of the way in which dative movement operates, however, does not share the merit of his observation regarding NP permutation. His view is that the more emphatic position for the indirect object is at the end of the sentence. This view is based on Chomsky's intonation centre view of focus. In Chomsky's model, postposing an NP to the end of the sentence cannot result in a sentence in which that NP is unambiguously focused.

It seems unreasonable that a speaker would attempt to focus an NP by back-shifting it, if this process cannot result in an unambiguous focus for the listener. The intonation centre view of focus is thus a suspect one, from a psychological standpoint. However, Chambers' observation that dative movement is similar to passivization is a sound one. To incorporate it into a theory of focus is desirable; however, it is also important to consider the possibility of developing a model of focus which is suitable as a hearer description.

One way to incorporate both properties into a single theory is to discard the definition of focus as "a phrase containing the intonation centre." Then, the model could allow dative movement to act like passivization does in Chambers' model-- that is, emphasizing an NP by front-

shifting it. For this reason, (10b) is chosen here as the underlying form, and the following is the approximation to the dative movement rule which will be preferred in this study:

DATIVE (optional)

SD:	V	NP	P	NP	
SC:	1	2	3	4	-->
	1	4+2	∅	∅	

Dative movement, then, determines the order of the patient and beneficiary NP's, relative to each other.

In Chafe's model, one purpose of passivization is to focus the agent NP, in the sense of indicating that it conveys new information. This notion of the agent NP achieving some prominence by passivization is not found in Chambers' analysis, where back-shifting an NP sometimes is a reflection of focus, as in dative movement, and sometimes is not, as in passivization. As mentioned earlier, it is Chambers' treatment of dative movement, not that of passivization, that is viewed here as needing improvement.

Also at issue is the notion that contrastive stress is more important as a focus device than passivization or dative movement (Chambers, 1970, p. 124). Chafe (1970, pp. 222-23) stated much the same view; he argued that contrastive sentences have a more marked distribution of information than do passive sentences.

A further question, important to an overall understanding of focus, is how passivization, dative movement, and contrastive stress affect the semantic structure of the sentence as a whole. In particular, it may be that the potential focus devices discussed here affect not only the prominence of the words relative to each other, but also the strength of the ties within different groupings of the words.

The Experiment

The purpose of the experiment in this study is thus to investigate passivization, dative movement, and contrastive stress as focus devices. In particular, an attempt is made to compare the relative impact and scope of their effects.

According to the framework discussed in Chapter Two, focus variants can be considered to be P^1-equivalent sentences in which the constituents differ in their importance relative to each other. Relative prominence of constituents is assumed to be a semantics of discourse property. Thus, focus variants are not Sd-equivalent; they are not all equally suitable utterances in a given context.

The investigation of these differences in importance was thought to be best accomplished by a direct method. Subjects, therefore, were asked directly for judgments of the importance of various sentence constituents. The basic experimental task was to rank order certain specified words

from a sentence, according to their importance to the meaning of the sentence. This direct technique was thought to be preferable to a task involving memory, for the reasons mentioned (p. 88 above) in discussing Fillenbaum (1970).

In the first experimental task, subjects were asked to judge the importance of words in a sentence relative to each other. Secondly, it is appreciated that word-by-word decisions on the subjects' part may be unnatural as compared to actual language use. With this problem in mind, a second task was designed in which subjects were asked to rank order pairs of words. The inclusion of this task thus represented an attempt to investigate the effects of passivization, dative movement, and contrastive stress on the semantic structure of the sentence as a whole. In order to complete the design, a third experimental task was added -- the subjects were asked to rank order triples of words. It was anticipated that the results from this task would add to the information regarding the overall effect of each of the focus devices on the entire sentence.

CHAPTER FIVE

METHOD

Stimulus Materials

Subjects were presented with simple dative sentences of
the following basic form:

(1) John gave the book to Andrew. (A/B)

In (1), John is agent (subject), book is patient (direct
object), and Andrew is beneficiary (indirect object). The
syntactic variants of this sentence which result from
application of combinations of the passive and dative
movement transformations were also presented:

(2) John gave Andrew the book. (A/F)

(3) The book was given to Andrew by John. (P/B)

(4) Andrew was given the book by John. (P/F)

The coding to the right of sentences (1)-(4) identifies
their structure in terms of voice and indirect object
position as follows:

(a) A refers to an active sentence, P to a passive
     sentence.

(b) B refers to the back indirect object position --

the indirect object follows the direct object.
F refers to the forward indirect object position
-- the indirect object precedes the direct object.

Contrastive stress variants were also present. Thus, for
the (A/B) sentences, the following patterns of contrastive
stress occurred:

(5) John gave the book to Andrew. (A/B/N)

(6) John GAVE the book to Andrew. (A/B/V)

(7) JOHN gave the book to Andrew. (A/B/G)

(8) John gave the BOOK to Andrew. (A/B/D)

(9) John gave the book to ANDREW. (A/B/I)

The contrastive stress coding is as follows:

(a)   N indicates no contrastive stress.

(b)   V,G,D,I refer to contrastive stress on the verb,
      agent, direct object, and indirect object,
      respectively. Contrastive stress occurs only once
      in each of these sentences.

The same constituents were contrastively stressed for the
(A/F), (P/B), and (P/F) sentences. There were therefore
twenty distinct sentence types -- five contrastive stress
positions in each of four syntactically distinct sentences.

The sentences also varied in semantic content. In
addition to sentence (1), three other contents were used:

(10) Peter handed the flashlight to George.

(11) Joanne sent the picture to Barb.

(12) Jill offered the magazine to Betty.

In choosing the four sentence contents, the use of
semantically loaded terms was avoided. It was thought that,
as a consequence of this choice of innocuous lexical items,
the variation in semantic content in the experimental
sentences would not influence the subjects' judgments.
Semantic content was not treated as a factor in the analysis
of the data. The experimental results (see Chapter Six)
thus cannot be claimed to hold for sentences which contain
semantically loaded lexical items.

In order to safeguard against an effect reported by
Wales (1970), only definite articles were used in the direct
object NP. Wales (1970) reported a significant interaction
between definiteness and focus, with subjects tending not to
regard indefinite noun phrases as focused. It is recognized
that a definiteness effect may be inescapable for the type
of sentence chosen here, since both proper nouns and
definite NP's were used. It is not known whether proper
nouns and definite NP's differ significantly in their focus
possibilities. Since proper nouns are regarded
linguistically as being definite (Wales, 1970, p. 71), the
direct object NP was made definite rather than indefinite in
order to minimize possible differences in focus properties
between the agent and indirect object NP's, and the direct
object NP.

Each of the twenty sentence types appeared once in the study in one of the four semantic contents. The order of presentation was randomized, with the restriction that no two of the same content or of the same syntactic type occurred in sequence. One practice sentence preceded the experimental sentences. A list of the twenty experimental sentences, in the presentation order, is given in Appendix A. The sentences were tape-recorded, as were the subject instructions (Appendix B). The stress pattern of each of the recorded experimental sentences was evaluated independently by several of the teaching staff and graduate students of the Linguistics Department, in order to ensure that the stress patterns were as described in Appendix A.

Subjects and Procedure

The subjects (Ss) were 79 high school students attending Jasper Place Composite High School in Edmonton. The experiment was conducted during three regular classroom sessions; one class from each of the high school's grade levels (10, 11, and 12) served as subjects. Each S was a native speaker of English, with no known hearing impairment.

The experiment was paced by the slowest member of the group, since aural presentation was used. In order to make supervision of the experiment more manageable, each class of subjects was divided into four groups, with a maximum of nine subjects in a group. Each group listened to the

recorded material over headphones at a separate listening centre. Thus, each group could proceed at its own rate. Four University of Alberta graduate students assisted the experimenter; each supervised a group of Ss.

There were three experimental tasks (Appendix B). All Ss did the tasks in the same order. For each task, each S had an answer booklet. Each page of the booklet corresponded to one of the sentences on the tape. The page contained the written version of the sentence (contrastive stress was not indicated) and, for the first task, a list of four words from the sentence (agent, verb, patient, and beneficiary) with a box beside each word.

Ss were instructed to rank order the words according to their importance to the meaning of the sentence, 1 indicating the most important and 4 the least important word. Ss were urged to listen to the sentence on tape before turning to the appropriate page. This was done in order to ensure that the Ss did not impose their own stress pattern on the written sentence, but rather made their choices on the basis of the recorded version. Each sentence was recorded three times in succession on the tape, with about three seconds between presentations. The tape was stopped between different sentences until all Ss in the group had completed their ranking.

The second experimental task was similar to the first. Ss were asked to rank order the six pairs of words

(verb/agent, verb/patient, verb/beneficiary, agent/patient, agent/beneficiary, and patient/beneficiary) according to their importance to the meaning of the sentence. The sentence set was the same as that used in the first task. The subjects' booklets for this task had a sentence on each page, as in the first task. Below the sentence was a set of six boxes indicating the six pairs of words to be ranked. The boxes were arranged in a matrix pattern, as illustrated in Figure 1. The four words which form the pairs were

```
+-----------------------------------------------+
|                                               |
|        John gave the book to Andrew.          |
|                                               |
|                                               |
|         John   gave  book  Andrew             |
|    John ........  [ ]   [ ]    [ ]            |
|                                               |
|    gave ..............  [ ]    [ ]            |
|                                               |
|    book ....................    [ ]           |
|                                               |
|    Andrew                                      |
|                                               |
+-----------------------------------------------+
```

Fig. 1.   Sample page for second task.

listed as in Figure 1, in the order in which they occur in the sentence. It is recognized that this may lead to a left-to-right bias in the ranking. If some of the pairs are difficult to rank, there is a possibility that Ss may fill in the rank numbers from left to right, or top to bottom.

However, it was deemed unwise to scramble the word order.
Scrambling would make it more difficult to keep track of all
the pairs, especially since each of the sentences contains
two proper nouns.

The third experiment was similar to the first two. Ss
were instructed to rank order the four triples of words
(verb/agent/patient, verb/agent/beneficiary, verb/patient/
beneficiary, and agent/patient/beneficiary) according to
their importance to the meaning of the sentence. As in the
earlier tasks, each page of the answer booklet contained the
written version of one of the sentences. Below the sentence
was a list of the four triples from the sentence, with a box
beside each triple.

The three experimental tasks together consistently
required approximately one hour to complete, for all the
groups. One group (7 Ss) in the Grade 11 class was unable
to complete the third task in the class time available, due
to tape recorder difficulties earlier in the session.

CHAPTER SIX

RESULTS

Basic Approach

The analysis of the experimental data was based on two
complementary statistical techniques, because both the
inter-subject variation and the treatment effects are of
interest. A standard analysis of variance (ANOVA) was used
to assess the statistical significance of the effects of
passivization, dative movement, and contrastive stress. In
addition, the nature of the variation among subjects was
explored by employing an analysis for ranked data based on
Winer's method (1971, p. 301). In both analyses, the
responses from all 79 $\underline{S}$s were analyzed together. A
preliminary analysis of variance had indicated that there
were no significant effects due either to the $\underline{S}$s' age, grade
level, or sex, or to the fact that four graduate students
had supervised different groups of $\underline{S}$s.

The analysis for ranked data provided information about
the differences among $\underline{S}$s, although it maintains an emphasis
on the sentence properties, rather than on individual $\underline{S}$ rank
score profiles. The input required for this analysis is a
concise arrangement of the data which permits the main

trends to be seen from the data tables themselves.

First Task Results

Appendix C gives a summary of the data for the first task, which consisted of rank ordering the four terms according to their perceived importance to the meaning of the sentence. Each column in Tables C-1 and C-2 represents one of the twenty different sentence types used in the experiment, while the four words which the Ss were asked to rank and the four possible ranks for each word are represented as rows in the table. The number of Ss who assigned a given rank to a particular word for each of the twenty sentence types is given in the tables. For example, fourteen Ss assigned rank 1 to the verb for the active sentence with back dative position and no contrastive stress (John gave the book to Andrew), while for the same sentence type, fifty-five of the Ss chose the agent as the most important element.

Analysis for Ranked Data

These data were analyzed using an analysis for ranked data (Winer, 1971, p. 301). This analysis consists of the Friedman test for mean rank differences, and a test of the significance of the average intercorrelation between Ss. Both computations involve a separate analysis for each

column of the data in Tables C-1 and C-2.

For each sentence type, the Friedman test indicates the significance of the differences in importance of the four words which the Ss ranked. Where these differences are not significant, one may infer either that the Ss were responding randomly because there was no basis provided for differential responses, or that they actually perceived the terms as being of roughly equal importance.

The Friedman test uses the chi-square statistic. These chi-square values are given in Table C-3 and are all, with two exceptions, highly significant (p<.01). The significant chi-square values indicate that there were reliable differences in importance among the four major words for most sentence types, as far as these Ss were concerned. For example, for the first sentence type (A/B/N), the differences among the average ranks assigned for the verb (2.34), agent (1.54), direct object (2.66), and indirect object (3.46), can be viewed as reflecting reliable differences. These average ranks can be computed from Table C-1. Most sentence types, then, did provide a viable basis for making differential judgments. There was no significant difference in the importance of the four major words in only two sentence types:

(1) John gave the book to ANDREW. (A/B/I)

(2) Andrew was given the book by JOHN. (P/F/G)

In the second part of the analysis, the average intercorrelation between $\underline{S}$s, r', is computed. This statistic represents, for each sentence type, the inter-subject agreement for the rankings, and is given in Table C-3. For sentence types in which r' is not significant, then, there is no evidence that the $\underline{S}$s shared a common view of the relative importance of the four words. The average intercorrelations between $\underline{S}$s for the data in Table C-3 range from .003 to .460. Ten of them are highly significant (p<.01), indicating that for half of the sentence types investigated, there was significant agreement among the $\underline{S}$s concerning the rankings of the four words.

In general, the highly significant intercorrelation values occurred for the sentence types in which contrastive stress was on the first or second element (first noun or the verb), while smaller values of r' occurred when the third or fourth element was contrastively stressed. The smaller inter-subject agreement for the latter sentence types suggests that the contrastive stress seemed to be in conflict with the position focus devices for these sentence types. This resulted in ambiguity concerning the focused item in the sentence and caused the confusion or lack of agreement among the $\underline{S}$s.

This analysis of the ranked data shows, then, that some sentence types result in highly significant inter-subject agreement for the rank-ordering task, while other sentence

types do not. From the pattern of significance of the average intercorrelation values, it seems that stressing the third or fourth word is an ineffective focus strategy, since it results in ambiguity concerning which item is focused. In the two worst cases (sentences 1 and 2 above), in fact, stressing the final element caused so much ambiguity that the S̲s as a group could not consistently discern significant differences in the importance of the four words.

Another point of interest from this analysis is that the average intercorrelation values are generally low. This indicates a somewhat weak general consensus and suggests that clear and consistent assignment of all ranks did not occur. The most reliable segment of the ranking process, of course, is the S̲s' first choice; following that, the second, third, and fourth choices may be indistinguishable, or assigned more at random. To minimize this latter aspect, the following discussion will focus on the S̲s' first rank scores.

Table C-4 expresses the first rank results of Tables C-1 and C-2, but in percentage form rather than as frequencies. These tables show, for each of the four words which were ranked (rows) in each of the twenty sentence types (columns), the percentage of the Ss who assigned the first rank to that word. Thus, 86% of the S̲s considered the agent to be the most important word to the meaning of such sentences as "JOHN gave Andrew the book" (A/F/G), while 4%

considered the agent to be the most important word in
sentences of the form "ANDREW was given the book by John"
(P/F/I).

It has been noted previously that some sentence types
resulted in low inter-subject agreement in the overall
ranking task. The lowest r' value, .003, occurred for such
sentences as "Andrew was given the book by JOHN." This
sentence type is represented in the P/F/G column of Table C-
4. It can be seen from the numbers in this column that the
Ss as a group did not resort completely to random guessing
for this sentence; rather, a two-way split in S strategies
is evident, with 41% choosing the stressed element as most
important and 30% opting for the first word in the sentence.
Thus, 71% of the Ss chose either the first word or the
stressed word, while only 29% chose one of the other two
words. This response pattern differs significantly from the
random response of an equal number of Ss choosing each of
the four words. This is indicated by the chi-square
statistic, which was highly significant (p<.005) for this
sentence type as well as for all the other sentence types.
Thus, even for an average intercorrelation of .003, the Ss
were not responding randomly.

The highest r' value, .46, was obtained for sentences
such as "The BOOK was given to Andrew by John." Here, in
the P/Б/D column of Table C-4, it is clear that no split in
S strategy occurred, since 84% of the Ss chose the direct

object as the most important word to the meaning of the sentence. For this sentence type, stress occurs on the first noun of the sentence.

From Table C-4, it is apparent that the first noun in each sentence type is regarded, on the average, as more important than the other nouns or the verb. To facilitate discussion of the two main S strategies -- choice of the stressed item, and choice of the first noun -- the data of Table C-4 are re-arranged in Table C-5. The rows of Table C-5 indicate the four words which the Ss ranked, identified by their position in the sentence; the columns indicate the stress location, again according to the position of the stressed word in the sentence. The dependent variable is the percentage of Ss who assigned a rank of 1 to the given word under the specified conditions.

In Table C-5, it can be seen that when stress occurs on the first noun, it is chosen as most important on the average by 81% of the Ss. In the unstressed sentence types, the first noun is chosen by 65%. When stress occurs on the verb, second noun, or third noun, the stressed element is chosen as most important by 58%, 44%, and 34% of the Ss respectively, while the first noun of the sentence is chosen by 31%, 39%, and 43% for these three sentence types respectively.

In all cases where stress occurs, then, the data show that 77%-89% of the Ss choose either the first noun or the

stressed element as being the most important word. Thus, the results suggest that there are two main kinds of focus device operating in the stimulus sentence types. The first is contrastive stress; the second involves word order -- in particular, since the first word in the sentence is often chosen, the device of front-shifting may be regarded as a focus device.

Front-shifting is represented in the stimulus sentences by two syntactic operations, passivization and dative movement. The effect of these devices separately, as well as that of contrastive stress, can be observed in Tables 1, 2, and 3, which were obtained by grouping the data of Table C-4. For example, Table 1 shows the effect of passivization on the Ss' rankings. Thus, for the ten active sentences, an

TABLE 1

PERCENT DISTRIBUTION OF FIRST RANK

VOICE EFFECT

Item Ranked	Active	Passive
Verb	24	21
Agent	53	13
Direct Object	13	37
Indirect Object	11	29

average of 53% of the Ss chose the agent as the most important element. For the passive sentences, an average of 37% of the Ss chose the direct object as the most important

item, while 29% chose the indirect object. For half of the
passive sentences, the direct object was the first NP in the
sentence, and for the other half, the indirect object
appeared first.

Table 1 shows that passivization has no effect on the
Ss' choice of the verb as most important element. However,
passivization does cause a large decrease in the percentage
of Ss who choose the agent, and an increase in the
percentage of Ss who choose the direct object or the
indirect object. The direction of the change supports the
notion that the aspect of passivization which is most
relevant as a focus device is front-shifting.

Table 2 shows that dative movement has no effect on the

TABLE 2

PERCENT DISTRIBUTION OF FIRST RANK

DATIVE POSITION EFFECT

Item Ranked	Back	Forward
Verb	22	23
Agent	32	34
Direct Object	36	14
Indirect Object	10	30

percentage of Ss who choose the verb or the agent as the
most important word. Dative movement, considered as a
front-shifting of the indirect object, does cause a decrease

in the percentage of Ss who choose the direct object (from
36% to 14%) and a corresponding increase in the percentage
of Ss choosing the indirect object (from 10% to 30%). Thus,
dative position is a significant focus variable which
determines the relative preference of Ss for the direct
versus the indirect object. Of these two nouns, more Ss
chose the one which occurred earlier in the sentence. Thus,
dative movement, by reversing the order of the direct and
indirect objects, altered the relative importance of these
two nouns.

The effect of contrastive stress is shown in Table 3,
where the rows represent the words which the Ss ranked, and
the columns represent the five different stress locations.
As expected, this table shows that stressing any one of the

TABLE 3

PERCENT DISTRIBUTION OF FIRST RANK

CONTRASTIVE STRESS EFFECT

Item Ranked	N	V	G	D	I
Verb	17	58	13	11	14
Agent	36	21	59	26	22
Direct Object	25	13	17	52	16
Indirect Object	22	8	10	12	48

four words causes an increase in the percentage of Ss who
view that word as the most important.

The data as arranged in Tables 1, 2, and 3 provide an indication that passivization, dative movement, and contrastive stress each influenced the $\underline{S}$s' choice of the most important element in the sentence. A full analysis of these focus effects is provided by the standard analysis of variance technique.

ANOVA Results

The ANOVA design that was employed here does not provide an assessment of the significance of the $\underline{S}$s effect or any $\underline{S}$s-by-treatment interactions. The ANOVA would clearly be inappropriate if any one of the possible $\underline{S}$s-by-treatment interactions proved to be characterized by a significant crossover pattern, suggesting radical differences in subject response strategies. A hierarchical clustering analysis (Veldman, 1967, p. 308) was employed in order to investigate the nature of possible subject differences. This analysis indicated that the strategy differences were minor; they represent the relative sensitivity of the $\underline{S}$s to each of the treatments, rather than opposite reactions by different $\underline{S}$s to any given treatment. The hierarchical clustering technique will be discussed in greater detail later in this chapter.

The ANOVA model used here was a three-way, fixed effects, factorial design, with $\underline{S}$s serving as randomized blocks. The three treatment factors were voice (two

levels), dative position (two levels), and contrastive stress (five levels). The dependent variable was the rank that the subject assigned to the verb, agent, direct object, and indirect object. The data consisted of this measure for each of the twenty sentence types and each of the 79 subjects. Four separate analyses of variance were carried out -- for the verb, agent, direct object, and indirect object rankings. The computer program employed was BMD:08V (Dixon, 1970). A summary of the results is given in Appendix D.

Table D-1 summarizes the results of the Ss' rankings of the verb under the various conditions of voice (V), dative position (DP), and contrastive stress (C). Of these, only the effect of contrastive stress was significant (p<.001). Passivization and dative movement both shift the position of noun phrases, but neither affects the linear position of the verb in the sentence. It is reasonable, therefore, that they should not act as focus devices as far as the verb is concerned. The interaction VxDPxC was significant (p<.01), but did not shed any light on the interpretation of the verb rankings.

In Table D-2, the results of the agent rankings are given. Voice and contrastive stress variations both resulted in highly significant (p<.001) F ratios. Passivization determines the relative linear positions of the agent and any other noun phrases in the sentence, and

thus the strong focusing effect on the agent is not surprising. Dative movement, on the other hand, has no effect on the linear position of the agent for the sentences under consideration, since the agent is either first or last in the sentence, depending on the voice. Thus dative position, as expected, is not a significant factor in the analysis of variance for the agent. The significant (p<.01) interaction VxC can be inferred from Figure D-1. It can be seen from this graph that the interaction is primarily related to the large difference in agent mean rank between the active and passive forms in the normal stress case. The greater difference in the mean ranks for normal stress indicates a greater effect of linear position when contrastive stress is not present to moderate the observed tendency to regard the agent as the most important term in active sentences.

The analysis of variance for the direct object rankings is shown in Table D-3. Voice and dative position both had highly significant (p<.001) effects. This is reasonable, since both passivization and dative movement affect the position of the direct object relative to the other sentence constituents. Contrastive stress also had a highly significant (p<.001) effect. There is some indication, in the barely significant (p<.05) VxC interaction, of relatively greater differences in the mean ranks for the normal stress case, as compared to the contrastively stressed cases. In particular, the direct object in first

position in the P/B/N form is rated as more important than would be predicted on the basis of the other sentence types. This parallels the effect observed for the agent in active sentences and shows the primacy attached to the first NP in sentences with normal stress.

The results of the indirect object rankings are summarized in Table D-4. Voice, dative position, and contrastive stress all had highly significant ($p<.001$) effects, as in the direct object results. One highly significant ($p<.001$) interaction, DPxC, was also present. This is implicit in the lack of parallelism in Figure D-2. As in the case of the direct object and the agent, the sentences with normal stress result in larger differences in the indirect object rankings. Thus, position is consistently a relatively more prominent focus variable in the absence of the competing device of contrastive stress.

Two additional analyses of variance were carried out, on the data from the active sentences only, to check the effect of dative position on the Ss' rankings of the direct and indirect objects. This was done in order to determine whether the significant effect of dative position found in the main ANOVA calculations was due only to the object NP being shifted to the first position in the sentence, which occurs in the passive sentences.

Dative position was found to have a highly significant ($p<.001$) effect on the Ss' rankings of both the direct

object and the indirect object, for the active sentences.
The results indicated further that the second NP in active
sentences is in fact regarded as more important than the
third NP.

A Comparison of the Focus Devices

Front-shifting (by passivization or dative shift) and
contrastive stress are identified by the experimental
results as two effective focus mechanisms. A measure of
their relative strength is available from Table C-5 for
those sentence types in which a split in strategy occurred.
When the second or third noun is stressed, the first noun is
assigned rank 1 by an average of 41% of the Ss, while 39%
choose the stressed noun. Thus, the first position noun and
the stressed noun are chosen equally often as the most
important element for these sentence types.

A second, more general, measure is the mean rank
assigned to the first, second, and third nouns in both the
unstressed and stressed cases. These mean ranks, which are
graphed in Figure D-3, were computed from the results of the
standard ANOVA (Table D-5). Figure D-3 illustrates the
amount of the change in importance that is brought about by
stressing a noun in a given position, or by altering its
position. It does not represent the rank profile that would
be expected for all three nouns in any one sentence. It can
be seen from Figure D-3 that contrastive stress has a larger

effect the further back the stressed NP is located; initial NP's are already emphasized by their position.

Table D-5 also provides some data concerning the relative distribution of importance in active and passive sentences. For the normal stress situation, the mean rank for the grammatical subject in the active (i.e., the agent) is 1.68, while for the passive (i.e., the direct or indirect object), it is 1.57. The corresponding mean ranks for the two grammatical objects is 2.96 for the active and 2.94 for the passive. Thus the active and passive sentences show roughly the same relative importance of the subject and objects. Since passivization does not make the grammatical subject more prominent relative to the grammatical objects, the passive sentence form cannot be said to be "marked" in this sense.

Subject Groupings

As mentioned previously, the standard ANOVA technique would be inappropriate if any significant Ss-by-treatment interaction showed radically different response patterns. Fortunately, the hierarchical clustering analysis (Veldman, 1967, p. 308) revealed that such patterns were not present in the data. In addition, this subject grouping technique is of interest because it provides a rough indication of the percentage of Ss who responded to each of the different experimental focus devices, for each of the words which the

Ss ranked.

In order to investigate, for example, the effect of voice on the Ss' rankings of the agent, the scores which the Ss assigned to the agent in each of the twenty sentence types were used. They were standardized within each S, since it is not the absolute score assigned to the agent, but rather the sensitivity of the S to the various focus devices that is of interest. These twenty scores were then reduced to two scores -- the average standardized rank that the S assigned to the active sentences, and to the passive sentences. The hierarchical clustering program then grouped the Ss according to the similarity of their score profiles. The program minimizes the increase in total within-groups variation at each step as it combines groups of Ss. The number of groups of Ss which may be said to differ in score profiles is determined by graphing the error index, and choosing the number of groups at the point preceding a relatively large increase in the error function (Veldman, 1967, p. 311).

When the group profiles are graphed, it can be seen that crossover patterns do not occur, in general. Thus, the hierarchical clustering technique groups the Ss according to the extent of their response to voice, dative position, or stress change. Different groups of Ss do not respond in opposite ways to the same focus device; rather, they simply show differing degrees of sensitivity to the focus device.

The exception to this general finding occurred for contrastive stress, where slight crossover patterns were observed. As many as nine Ss reacted in the opposite way to stress; that is, nine people considered the verb to be less important when stressed than when the sentence had no contrastive stress. Similarly, five people reacted in this way to stress on the agent, and five others -- not the same Ss -- to stress on the direct object. Three Ss showed this unusual response to stress in ranking the indirect object. The extent of this qualitative difference in S responses is slight, and should not affect the validity of interpreting the standard ANOVA results.

In general, it is difficult to classify the Ss as sensitive or not sensitive to a particular focus device, since the grouping technique did not reveal qualitative differences in S profiles, but rather a range of quantitative differences. For the relevant focus devices (dative position, voice, and stress for the direct and indirect objects, voice and stress for the agent, and stress for the verb) the clustering technique showed that 25% to 42% of the Ss were only slightly responsive to the focus device, while all the others were more strongly influenced by it.

Second and Third Task Results

The results of the second and third tasks will require only a brief discussion, since they are highly consistent with the first task results. As in the preceding discussion, the results of the ranked data analysis are presented first, followed by the standard ANOVA results.

Analysis for Ranked Data

In the second task, the $\underline{S}$s were asked to rank order the six pairs of words formed from the three nouns and the verb. Tables E-1 and E-2 summarize the data. The Friedman test for difference in mean ranks produced the chi-square values, given in Table E-3, which indicate the significance of differences in importance of the six pairs of words. These chi-square values are all highly significant ($p<.01$). Also shown in Table E-3 are the average intercorrelations between $\underline{S}$s for each of the twenty sentence types. These r' values range from .16 to .45. Ten of the r' values are highly ($p<.01$) significant; half of the sentence types resulted in significant inter-subject reliability in the rankings.

As in the first task, the highly significant r' values generally were obtained for the sentence types in which contrastive stress occurred on the first or second element. Further, as in the first task, lower r' values occurred when the third or fourth element was contrastively stressed.

The average intercorrelations are low, as was the case in the first task analysis. In order to try to extract the most reliable data, the data for the first rank only, expressed in percent form in Table E-4, will be considered next.

In Table E-4, the number in each cell represents the percentage of the Ss who assigned the first rank to a given pair under a given stress condition. The NP's are specified in this table by their position in the sentence, rather than as agent, direct object, or indirect object. Two results are noteworthy here. First, rank 1 was assigned to a noun-verb pair on the average by 72% of the Ss, while 28% chose a noun-noun pair as being the most important. Secondly, the pair consisting of the first noun (grammatical subject) and the verb (V-N^1) was especially prominent. Thus, the split in S strategies which occurred in the first task when the second or third noun was stressed, did not occur here. From the first task results, one would predict that when the second noun is stressed, the Ss would choose as the most important pair V-N^2 as often as they chose V-N^1. However, V-N^1 was chosen twice as often as V-N^2. Thus, contrastive stress is not as powerful as front-shifting when judged in the second task.

The data summary for the third task is given in Tables F-1 and F-2. The Ss were asked to rank order the four triples of words, as specified in the first column of Tables

F-1 and F-2, according to their importance to the meaning of the sentence.

This task appeared to be less meaningful for the $\underline{S}$s, measured by the lower chi-square and average inter-correlation statistics (Table F-3). For five of the sentences, the chi-square value was not significant at the .01 level; for these sentences the $\underline{S}$s did not discern significant differences in importance among the four triples of words. Further, only six r' values were significant (p<.05). Thus the inter-subject level of agreement was low. The trends for the assignment of first rank, however, are not surprising. The most frequently chosen triple is $V-N^1-N^2$, and its stress variants.

ANOVA Results

For the second task data, this analysis clearly indicates the above-mentioned prominence of verb-noun pairs. They were assigned an average rank overall of 3.0, as compared to a mean rank of 4.0 for the noun-noun pairs. The ANOVA fits in well with the results of the first task concerning the significance of the main effects. Contrastive stress was highly significant (p<.001) for all pairs except verb - indirect object (p<.05). However, F-ratios for stress were smaller than in the first task, and much smaller than voice and dative position F-ratios. This finding agrees with the observation from the ranked data

analysis that stress is not as powerful as front-shifting when judged according to this task. Voice was highly significant (p<.001) for the verb-noun pairs. This is not surprising, since the noun in each pair is sensitive to voice change in the first task. Dative position was highly significant (p<.001) for the verb - direct object and verb - indirect object pairs. This result would be predicted from the first task, since the direct and indirect objects are sensitive to dative movement.

Voice was barely significant (p<.05) for the agent - direct object and agent - indirect object pairs. The voice change which enhances the agent decreases the importance of the objects, and vice versa. Thus, for the agent-object pairs, the effect of voice almost cancels out. Also of interest for these two pairs is the result that dative movement was not significant. The first task would predict significance, since the two objects are sensitive to dative position, and the agent is not. The apparent anomaly is clarified by the nature of the significant (p<.001) VxDP interaction for both pairs. This interaction and its related main effects are graphed in Figure G-1 for the agent - indirect object pair. The crossover pattern can be explained by taking into account the distance between the two members of the pair. For the active/back and passive/forward sentence types, the agent and indirect object are separated only by the verb, but for the active/forward and passive/back sentences, the two nouns are

at opposite ends of the sentence, which reduces their importance as a pair.

The same distance effect is seen, though less clearly, in the verb-object pairs. The VxDP interaction for the verb - indirect object pair can be inferred from Figure G-2. Both passivization and dative movement increase the importance of the pair, and no cross-over pattern occurs. The slope for the active sentences shows the distance effect, since in the active/back type, the verb and indirect object are separated by another noun. The smaller slope of the passive sentences reflects the absence of the distance effect; in both kinds of passive sentence, the verb and indirect object are juxtaposed.

Finally, for the direct object - indirect object pair, voice was significant ($p < .01$), which is expected since a voice change affects the importance of both objects in the same direction. Thus, the second task ANOVA results are all predictable from the first task ANOVA, except for an added "distance effect."

Even though the ranked data analysis suggested that the third task was less meaningful than the others, the pattern of significance of the main effects as shown by the standard ANOVA agrees well with the first task results. Contrastive stress was highly significant for all four triples ($p < .001$). The observed voice and dative position results can be predicted from the first task. If a single noun is

sensitive to voice or dative position, then the triple which leaves out that noun is sensitive to that focus device. Thus, voice is significant (p<.001) for all but the agent - direct object - indirect object triple, since it is significant in the first task for all but the verb. In other words, a focus device which makes one element in the sentence more important, makes the other three elements as a triple less important, and vice versa.

The three tasks resulted in highly consistent assessments of the significance of the treatment effects. This result is encouraging, since it provides evidence that the effects of stress, passivization, and dative movement are prominent and stable.

The above results have been reported and interpreted largely independently of the existing theories. In the following chapter, the impact of these findings on theoretical accounts of focus is considered.

CHAPTER SEVEN

DISCUSSION

Relevance of Experimentation

In discussing the implications which the experimental
findings have for the theories of TGG, it is necessary to
summarize briefly some of the goals of the theories. Three
aspects of TGG are discussed below.

First, theories of TGG attempt to reflect the language
competence of the individual. In the earlier theories, the
notion of competence was viewed as independent of language
use. However, the domain of TGG theories has recently been
expanded to the point where the theories can be held
accountable for "knowledge of language use." Discussion of
such areas as discourse is now regarded as a necessary part
of an adequate competence theory. The expanded notion of
competence thus provides a framework for discussion of the
semantic significance of focus variables, which had pre-
viously been regarded as stylistic or performance factors.

Thus, some grammars now attempt to reflect the
idealized speaker-hearer's knowledge regarding the relative
semantic prominence of different sentence constituents.
Such competence is seen to consist of two facets --

knowledge of the basic structure of an utterance with
respect to focus, represented in the grammar by an
underlying structure, and knowledge of the interrelation-
ships which exist among sentences differing with respect to
focus, expressed in the grammar by optional transformations.
That is, the grammar assigns syntactic correlates to the
idealized language user's knowledge about focus.

Experimentation, of course, does not sample such
knowledge directly, but rather explores the use of language.
The same is true of linguists' intuitions. However, the
theories of focus, or of "knowledge of language use" in
general, must be responsible to the objectively measured
native speaker judgments which are provided by experiments.
Performance factors can be expected to alter individual
judgments somewhat. However, the results for a large group
of subjects, in a simple experimental task which is free of
memory and production variables, should reflect the main
aspects of their knowledge about focus. It would be
difficult to insist that a theory is correct if the subjects
as a group consistently behave in a manner favoring a
radically different prediction from that of the theory.
Slight quantitative differences between behavior and the
theory's prediction would be less damaging to the theory.

A second area of TGG, in which it is more difficult for
experimental results to make inroads, concerns the language
user. Language users, the subjects in psycholinguistic

experiments, may differ in their ability to use their language competence, and the theories claim not to be responsible to that variable. Language competence itself is assumed not to vary from person to person. An important reason for the failure of most theories even to consider variability among language users is no doubt the nature of the data-base which is commonly employed to test the theories. This data-base has generally consisted of the intuitions of the linguist himself. Experimental work, by expanding the data-base, and by minimizing the competing ability variables, such as those involved in memory and production, has indicated that the grammar must describe, not simply the individual's competence, but rather a considerable variation in competence (Gleitman & Gleitman, 1970; Fletcher, 1973).

Transformational generative grammars are product grammars; this is a third way in which the goals of the theory are restricted. Thus, the grammatical models attempt to mimic language competence by expressing, in the transformational component, relations of various strengths among the sentences of the language. The transformations are not expected to reveal or reflect the process by which the sentence was produced.

It was anticipated that the present experimental inquiry might point out theoretical shortcomings in two of the three areas discussed above. First, the experimental

results might indicate some aspects of focus which have not yet been incorporated into the theoretical models. Secondly, the assumption that all language users have the same competence is investigated through the use of a broader data-base than the individual linguist's intuitions. The present experiment, then, represents an attempt to identify the focus variables and the variation in language user competence which an adequate product grammar must describe.

Implications for Linguistic Theory

Passivization

First, passivization was found to cause a shift in relative prominence of the agent, patient (direct object), and beneficiary (indirect object), for the experimental sentences. A syntactic correlate of this focus effect was a change in the order of the noun phrases. The experimental results, then, have identified a semantically significant aspect of passivization. An adequate product grammar must reflect this semantic property. Chambers (1970) and Chafe (1970) both regarded passivization as a focus device. However, Chomsky (1971) and Jackendoff (1972) did not consider passivization from a focus standpoint.

Secondly, the results of this experiment indicate that front-shifting may be the basic focus mechanism of

passivization. Thus, the first noun phrase in the sentence
tends to be more prominent than later noun phrases. This
general finding fits in with Chambers' grammatical model, in
which the first noun phrase is the topic of any sentence,
where [+TOPIC] is a marker which indicates increased
importance. This particular aspect of Chambers' model
appears to have been motivated partly by psycholinguistic
experiments, such as that of Tannenbaum and Williams (1968)
concerning focus of attention. Chambers' grammatical
theory, in fact, is the only one discussed here which shows
evidence of being influenced by experimental results.

According to Chafe, however, passivization should focus
the agent. Chafe's theory, despite his concern with seman-
tic context, is based primarily on sentences considered in
isolation. In his model, word order is not considered in-
dependently of intonation. Thus, intonational prominence is
the only syntactic reflex of focus. Further, high pitch and
intensity denote new information, which is always prominent.
However, the experimental results do not support Chafe's
model; intonational prominence alone is insufficient to ac-
count for the relative importance of words in the sentence.

Markedness

A third point of interest concerning passivization is
that the subjects of the active sentences were as prominent
as the subjects of the passive sentences, as indicated by a

mean assigned rank of 1.68 for the active, and 1.57 for the passive. Thus a grammatical model in which the subject of a passive sentence is marked for focus while the subject of an active sentence is not, would be somewhat misleading.

Markedness is usually discussed theoretically in vague terms. The assertion that a particular sentence form is "marked" or "unmarked" with respect to focus is uninformative. Marking may be considered to be a formal device to trigger one sentence form rather than another. Sometimes, though, the theoretical models hint that markedness is a reflection of some semantic property. Thus, in Chambers' model, marking with respect to focus means that the marked word is more focused than usual. The implication is that the choice of which sentence of a pair is marked and which is unmarked is not arbitrary. However, just what does "more focused" mean? Does it mean that the focused word stands out more in its sentence than does any word in the corresponding unmarked sentence? Does the unmarked sentence indicate the normal distribution of semantic prominence for the first, second, and third noun phrases, or alternatively for the agent, patient, and beneficiary? Or does the unmarked form simply indicate the more common sentence type of the two; if so, more common, based on what corpus of data? Without some indication of how the marked and unmarked forms differ, markedness is not subject to empirical testing.

The experimental data reported here can be useful in evaluating a more specific notion of markedness, such as the one proposed by Johnson-Laird (1968b, p. 7):

> ...the passive implies that the logical object is more important than the logical subject, whereas the active implies that there is a minimal difference in the importance of these two entities.

For the active sentences here, the grammatical subject received a mean rank of 1.68, while the two objects received a mean rank of 2.96. The passive sentences yielded corresponding ranks of 1.57 and 2.94 for the grammatical subject and objects respectively. Johnson-Laird's hypothesis does not reflect these experimental results. In fact, the active and passive sentences show similar distributions of semantic prominence for the grammatical subject and objects, or for the first, second, and third noun phrases in the sentence. While passivization does interchange the mean ranks assigned to the agent and the front-shifted object, it does not alter the distribution of importance for the surface structure constituents. Thus, when the direct object becomes the surface subject by passivization, it is not more prominent than the agent as surface subject in the corresponding active form.

The present results suggest, then, that corresponding active and passive sentence pairs should be thought of as focus variants with equal focus status, so that markedness in this sense may be a specious notion. Passivization,

then, should be thought of as altering the pattern of
importance of the words in the sentence, rather than as
introducing additional importance. Thus, the theoretical
use of the marked/unmarked distinction for sentences with
normal intonation, in the sense of an unmarked sentence
being colorless or unemphatic, is misleading in this
respect. In each of the experimental sentences with normal
intonation, both active and passive, the first NP was shown
to be focused.

Dative Movement

The second main effect shown by the experimental
results is that dative position is semantically significant
with respect to focus. Chomsky (1971, p. 203) has argued
for the significance of dative position, since sentences
which vary only with respect to the dative transformation
"differ in the range of possible focus and presupposition in
the way predicted by the position of the intonation center."
This statement may be taken to mean that the indirect object
is focused by placing it in the intonation centre of the
sentence. Chambers (1970) incorporated this more specific
idea into his grammatical model; the indirect object is
emphasized when it is back-shifted to the intonation centre.

Chafe (1970), however, considered dative position to be
semantically insignificant for active sentences. In Chafe's
framework, only transformations which alter the distribution

of old and new information are significant from a focus
standpoint. Dative movement in active sentences simply
exchanges the position of two predicate noun phrases, both
of which are seen as conveying new information. Chafe's
theory, then, cannot accommodate the present experimental
results regarding dative position.

An interesting result concerns the focus mechanism of
dative movement. It is the front-shifted noun phrase that
is prominent, not the noun phrase that is back-shifted to
the intonation centre of the sentence. This finding shows
up a weakness in the technique of building and testing
theories solely by introspection, since the theories
discussed here all predict either that dative movement is
not significant, or that it brings a noun phrase into focus
by back-shifting it to the intonation centre. The latter
option, in fact, is theoretically awkward in a grammar which
views passivization as a focus device. Chambers, for
example, emphasized the similarity of passivization and
dative movement in shifting NP's; partly on this basis he
justified his treatment of dative movement as a semantically
significant device. However, having stated that the two
transformations are similar, he then developed a theory in
which they work quite differently. The indirect object,
placed in the intonation centre by dative movement, is
emphasized. The agent, placed in the intonation centre by
passivization, is not emphasized. Secondly, dative movement
is needed in addition to passivization in Chambers' theory

in order to generate the surface structure "The book was given to Andrew by John." In order to trigger dative movement, "Andrew" must be marked [+FOCUS], but this marking is not realized at the surface level as movement to the intonation centre. Thus, the focus properties of sentences which result from the application of both passivization and dative movement are not clear.

The transformational theories of Chomsky (1971), Chambers (1970), Chafe (1970), and Jackendoff (1972) are all inadequate in reflecting the experimental results concerning the semantic significance of dative movement. The results regarding voice and dative position indicate a strong relation between linear order of constituents and their importance to the meaning of the sentence (Fig. D-3). A theory such as Chambers', which treats front-shifting and back-shifting as similar focus phenomena of about equal impact, would predict an inverted V shape for the top line of Fig. D-3. Similarly, a theory such as Chomsky's or Chafe's, which addresses the question of focus strictly in terms of intonation, would incorrectly predict the shape of Fig. D-3.

The results, of course, did not indicate that intonation is irrelevant to the matter of focus. The shape of the top line of Fig. D-3 reflects the effects of the order-changing transformations on the prominence of the noun phrases in the sentence. The results suggest that

passivization and dative movement are semantically
significant as focus devices but that this syntactic reflex
of focus is independent of intonation considerations. Both
of the transformations work in the same way; they increase
the prominence of an element by front-shifting it. Further,
the results indicate that the passive sentence is not "more
focused" than the active sentence, since the relative
prominence of the grammatical subject as opposed to the
objects is not increased by passivization.

Contrastive Stress

The experimental results also showed that putting
contrastive stress on a word, realized as a change in
intonation involving increased pitch and intensity,
increased the importance of that word. Jackendoff (1972)
and Chomsky (1971) did not discuss focus in terms of
semantic prominence; however, they did predict that a
contrastively stressed element is the focused item in a
sentence. Chafe's theory (1970), using the concept of old
and new information, does reflect the observed semantic
prominence of a contrastively stressed element. Chambers
(1970) also described the focus effect of contrastive
stress, signalled by a syntactic marker. The three syntax-
based theories -- Chambers', Chomsky's, and Jackendoff's --
encounter considerable difficulty in attempting to express
contrastive stress in syntactic terms because, as Bolinger
(1972) noted, the position of the contrastive intonation

centre is not predictable from the syntax. In this sense, these theories cannot be considered to provide an adequate treatment of contrastive stress.

Chomsky, Jackendoff, and Chafe all described the focus properties of sentences solely in terms of intonation. Each of these theories shows the influence of Halliday's notion of information focus, which represents only part of Halliday's theory of focus. A further point concerning the above TGG theories is that they all consider the intonationally prominent item, even in sentences with normal intonation, to represent new information. Thus, these theories, which treat focus as an intonation phenomenon, involve a framework of old and new information, or presupposition and focus. This general framework appears to have been influenced by Halliday's concept of information structure. Further, all of these theories indicate that the new information in the sentence, which is intonationally prominent, is also semantically prominent.

The present experiment was not designed to indicate which elements in a sentence represent old information and which represent new information. The experimental task did, however, provide a measure of the relative semantic importance of some of the sentence items. Thus, the adequacy of a theory of focus which is restricted to intonation properties can be examined by means of the experimental results, although the usefulness of the

framework of old and new information cannot be determined using the present experimental technique.

Within Chafe's concept of old and new information, new information is enhanced if it is a phrase containing the intonation centre. The experimental results support the view that the NP in the intonation centre is semantically prominent, but <u>only</u> if the intonation is contrastive. The prominence pattern which the theories predict for sentences with normal intonation is therefore not backed up by the data. Halliday too predicted that in cases of normal intonation, the later NP's in the sentence would be prominent because of intonation (1968, p. 213):

> Thus the nearer an item is to the end of the clause the more probable it is that that item will carry prominence as informationally 'new'.

Thus the theories of focus which are based on the view that the intonation centre conveys prominence have been inaccurate in describing cases of normal intonation, although they do reflect the increase in prominence which is brought about by contrastive stress. The concept of given and new information, or presupposition and focus, as developed in various theories, appears to be a plausible semantic basis for the observed experimental effect of contrastive stress. However, the "given-new" construct does not lead to an accurate description of the observed prominence pattern in sentences with normal intonation, since the experimental results indicate that the item in the

normal intonation centre is not semantically prominent.

An interesting result emerges from the comparison of
the relative impact of contrastive stress and front-shifting
as focus devices. As shown in Fig. D-3, the data indicate
that contrastive stress is not a more powerful focus device
than front-shifting; rather, the two processes simply
represent different ways of focusing information. This
result indicates that a theory of focus which is based
solely on intonation is inadequate, since such an approach
would ignore front-shifting, an equally powerful device.

Toward an Adequate Theory of Focus

The experimental results indicate that the grammar must
describe the focus effect of front-shifting a noun phrase,
whether by passivization or by dative movement. Chambers
(1970) and Halliday (1967-68) both recognized the prominence
of the first NP in sentences of the kind which have been
investigated here. Both theories postulated a second
semantic basis for focus, realized at the sentence level
independently of intonation. Although this second concept
enabled both theories to describe the focus effect of
passivization, neither theory correctly describes the change
in prominence pattern which is brought about by changes in
dative position.

The data, then, favor an approach, such as Chambers' or
Halliday's, in which a word order factor operates indepen-

dently of an intonation factor in determining the pattern of prominence of the words in a sentence. Chambers' proposal can be regarded as an attempt to state a Halliday kind of focus theory in terms of TGG. Some of the shortcomings of Chambers' theory, which were discussed in Chapter Two, may thus be reflections of the problems of TGG in accommodating an adequate theory of focus. Thus the data reported here raise two interesting questions. First, can Halliday's theory be amended in order to accommodate the experimental facts? Secondly, what would be the difficulties involved in incorporating such a theory into the TGG framework?

The experimental results generally support Halliday's basic concept of dividing a discourse grammar into information structure, involving intonation, and thematization, involving word order. However, the results also point out two shortcomings in Halliday's approach. First, as mentioned previously, Halliday stated (1968, p. 213) that the clause-final item, even under normal intonation, carries prominence because it is informationally "new." The data, however, showed that the clause-final item was the least prominent, even though it contained the intonation centre of the clause. This aspect of Halliday's theory can be made consistent with the experimental findings by the addition of the statement that for sentences of the experimental type at least, the occurrence of unmarked focus with normal intonation does not reflect increased prominence of the final lexical item. This change in Halliday's theory

is a minor one, since nothing else in his theory seems to depend on new information being prominent.

Secondly, Halliday's theory does not reflect the relation, illustrated in Fig. D-3, between the importance of a word and its linear order in the clause. Word order as a realization of semantic properties is treated in the area of thematization in Halliday's theory. However, according to his theory, semantic prominence of a constituent can be realized by word order only if the constituent is the theme, which is usually the first NP of the clause. This concept would need considerable revision in order to accommodate the experimental results concerning dative position, which indicated that the second NP in a sentence is seen as more important than the third NP.

The discord between theory and experimental results could perhaps be resolved through the use of Halliday's concept of information units. If a clause can reliably be divided into information units, and if in fact the experimental sentences were each composed of two or more such units, then the prominence of the front-shifted dative NP might be explained in these terms. A statement concerning the relative importance of the points of information focus in the linear sequence of information units would also be necessary in order to incorporate the observed order effect into Halliday's theory.

Toward an Adequate TGG Theory of Focus

The possibility of expressing Halliday's theory in a
TGG framework is an interesting one. Attempts have already
been made to incorporate the information structure part of
his theory into the interpretive semantics models of Chomsky
(1971) and Jackendoff (1972). The intonation centre concept
of focus has caused the grammarians some difficulty, because
contrastive stress is not easily discussed in a syntax-based
theory. This difficulty is most clearly seen in attempts,
such as Chambers', to express contrastive stress as a
syntactic phenomenon similar, for example, to clefted
structures. As discussed earlier, the intonation centre
view of focus is inaccurate in cases which do not involve
contrastive stress. Thus Chomsky's theory tends to be
incorrect, since he applied the Halliday concept of focus
mainly to sentences with normal intonation, the very
sentences for which it fails. Jackendoff did not avoid
discussing contrastive stress; he postulated an arbitrary
surface level focus marker F to indicate, in the presence of
contrastive as well as normal stress, which surface
constituent is the focus of the sentence. Jackendoff
pointed out that surface structure constituents which can be
focused may not be constituents at the deep structure level.
This observation indicates a further difficulty in attempt-
ing to incorporate a theory of focus into the Standard
Theory Model, as Chambers did, since such an attempt
requires focus to be specified at the deep structure level.

One of the basic concepts in Halliday's theory is that of "information unit," which is realized as a tone group. The present experimental data do not require this theoretical construct, but the concept may prove useful in understanding the distribution of given and new information in a sentence. If the concept does prove to be required in an adequate theory of focus, then it too would have to be expressed in TGG terms. This would present a problem for a syntax-based theory, since information structure is viewed as independent of constituent structure (Halliday, 1967, p. 200):

> The speaker is free to decide where each information
> unit begins and ends, and how it is organized
> internally; this is not determined for him by the
> constituent structure.

A syntax-based grammar, then, in attempting to incorporate Halliday's focus theory, would have difficulties with the concept of information unit in addition to the present difficulties with contrastive stress.

Thus it seems that a semantics-based grammar, perhaps one which reflects Chafe's general goals, could more readily assimilate a focus theory. Chafe's own grammar was inadequate in this respect, as the present experimental data indicate. However, Chafe simplified Halliday's theory considerably; for example, he attemped to correlate both intonation and word order phenomena with the distribution of old and new information. Thus, his theory does not express

front-shifting as a focus device. However, his theoretical
framework does not seem to preclude the possiblility of
considering word order prominence patterns independently of
intonation. At present, then, it seems that Halliday's type
of focus theory is the most promising; and a semantics-based
grammar seems the most likely place in which such a theory
might find its formal statement in TGG terms.

The Role of Experiments

It must be kept in mind that the effects reported here
have been demonstrated only for sentences of the form "John
gave the book to Andrew," and its voice, dative position,
and stress variants. Other variations in the sentences
might alter the results. For example, the linear order
effect might disappear in longer sentences, where first and
last elements might assume importance. Such a result would
call into question the idea that the focus effect of dative
movement can be expressed as front-shifting. Knowing
whether the present correspondence between linear order and
relative prominence persists is crucial in determining the
extent to which Halliday's thematization theory must be
revised.

Secondly, all the agents and indirect objects in the
experimental sentences were proper nouns, while all the
direct objects were definite noun phrases. This restriction
may not have affected the classification of the various

focus mechanisms. However, variation in the noun phrases must be investigated as part of the question of the semantic basis for focusing, especially if the theoretical models maintain an orientation of given and new information. It may well be, for example, that the stronger syntactic correlates of old and new information occur at the noun phrase level rather than the sentence level. Thus, definite noun phrases and pronouns might correlate highly with old information, while proper nouns and indefinite noun phrases might correlate with new information. Experimental support for this hypothesis has recently been reported by Grieve (1973).

Further, the mechanisms for focusing sentence elements other than nouns and verbs must also be investigated experimentally. Such experimental work might be able to shed some light on the question of the need for the concept of information unit in an adequate theory of focus.

Summary

In the introductory chapters of this study, some accounts of focus which have been expressed within a TGG framework were presented. A three-way distinction in the use of the term semantics was proposed; within this framework of Sc, St, and Sd, the various notions of meaning equivalence, as adopted by different TGG models, were discussed. The ability of a TGG theory to include an

adequate theory of focus is considered to depend on the
notion of meaning equivalence which that theory adopts, and
further, on whether Sd phenomena are seen as less
significant than Sc or St phenomena. Recently, theories of
focus have been expressed within the Standard Theory Model
(Chambers, 1970), the extended Standard Theory Model
(Chomsky, 1971; Jackendoff, 1972), and a semantics-based
model (Chafe, 1970). In addition, Lakoff (1971) has
indicated that the generative semantics framework is able to
accommodate a theory of focus. Such an attempt, however,
has not yet been made, and so could not be evaluated in the
present study.

In the interpretive semantics model, focus concepts
were not considered until notions such as the full
specification of meaning at the deep structure level were
well established. This may help explain the difficulty
which the extended Standard Theory Model has in
accommodating a focus theory -- much theoretical structure
has been built up, on other grounds, with which any focus
theory will be required to blend. The meaning-based models,
however, have attempted to abandon some of the earlier
syntax-based notions. Thus, they have the possibility of
being less resistant to the changes which are necessary in
order to accommodate a focus theory. They are also less
complete, however, so that their exact capacity for
incorporating focus variables is not easy to establish.

In the present experimental study, subjects were asked for direct judgments of the importance of words in a set of twenty sentences which varied systematically according to voice, dative position, and location of contrastive stress. These three sentence properties were considered to have possible focus roles. The results indicated that front-shifting, as occurs in passivization or dative movement, is a focus device, as is contrastive stress. These results are not presently accommodated in any of the TGG theories under discussion. However, Halliday's account of focus, which has not been expressed in TGG terms, was found to reflect the present experimental results better than the current TGG theories. Two areas of Halliday's theory which would require modification to accommodate the results were outlined here, as were some areas of possible difficulty in expressing such a theory within the framework of current models of TGG.

The role of psycholinguistic experimentation in the development of an adequate theory of focus is considered here to be of primary importance. The present experiment represents only a step toward a thorough investigation of focus. Only by taking into account the results of a wide range of experiments can a grammatical theory be expected to avoid the shortcomings of the current intuition-based models.

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APPENDIX A
EXPERIMENTAL SENTENCES IN PRESENTATION ORDER

0. Susan gave the GIRL a toy. (practice sentence)

1. The BOOK was given to Andrew by John.

2. Peter HANDED the flashlight to George.

3. JOANNE sent Barb the picture.

4. The magazine was offered to Betty by Jill.

5. GEORGE was handed the flashlight by peter.

6. John gave the book to ANDREW.

7. The picture was sent to Barb by JOANNE.

8. JILL offered the magazine to Betty.

9. George was handed the flashlight by Peter.

10. Joanne sent the PICTURE to Barb.

11. John GAVE Andrew the book.

12. Betty was offered the magazine by JILL.

13. Joanne sent Barb the picture.

14. Andrew was given the BOOK by John.

15. The flashlight was handed to GEORGE by Peter.

16. Jill offered BETTY the magazine.

17. Barb was SENT the picture by Joanne.

18. John gave the book to Andrew.

19. The magazine was OFFERED to Betty by Jill.

20. Peter handed George the FLASHLIGHT.

APPENDIX B
SUBJECT INSTRUCTIONS

In this experiment, I want to investigate the relative importance of words and of pairs of words in conveying the meaning of sentences. Some words are more important than others to the meaning of the sentence, and some pairs of words are more closely related than others in a particular sentence to convey its meaning.

The sentences you will hear on tape have varying word patterns and also varying stress patterns, because speakers of English convey information by using these methods. Please attend carefully to the way in which the sentence is presented on the tape, since this may be important for the meaning of the sentence, and you are interested primarily in the meaning of the sentences.

Some of the sentences may sound odd to you, because they are spoken in isolation, rather than in the natural context of a conversation. For this experiment, it was necessary to have isolated sentences, but please keep in mind that each of these sentences could occur in a natural English conversation, given an appropriate context. Throughout the three parts of the experiment, please keep in mind that I am interested in what you think about these sentences. Your first impressions about them are especially

valuable.

Please turn to the first page of your booklet, with the practice sentence on it. Each page of your booklet contains a sentence similar to this one. Below the sentence there is a list of the four basic words from the sentence, with a square beside each word. Each sentence will be presented three times on the tape. Except for the practice sentence, I want you to hear each sentence before you read it. So, please listen to the sentence at least once before you turn the page. Listen carefully as the sentence is presented on the tape three times. Then, rank order the four words according to their importance to the meaning of the sentence. First pick the word that is most important, and place a 1 in the square beside it. Then pick the second most important word and put a 2 in its square, and so on. Base your decisions on the way the sentence is presented on the tape. Your experimenter will stop the tape after the practice sentence, to answer any questions you might have. Please glance up from your booklet when you complete each sentence so that the experimenter will know when to give the next one.

--First Experimental Task--

The second part of the experiment is similar to the first, except that you will be considering the words in pairs. Some pairs of words are more closely related than

others to convey the central meaning of the sentence.

Please turn to the first page of your booklet. The row
of words and the column of words form a matrix, and each
square in the triangular pattern indicates a pair of words.
For example, on the card that your experimenter has, the
square marked with a 1 indicates the pair gave/girl, while
the pair marked 2 is the pair Susan/toy.

As in the first experiment, listen to the sentence on
tape at least once before you turn the page. Listen to the
sentence on tape again, and pick the pair of words which
goes together best to convey the meaning of the sentence.
Put a 1 in the square which indicates this pair. Continue
to rank the pairs 1 through 6.

Your experimenter will stop the tape after the practice
sentence to answer your questions.

--Second Experimental Task--

In the last part of the experiment, you will be
considering the words in groups of three. Some groups of
words are more closely related than others to convey the
central meaning of the sentence.

Please turn to the practice sentence. The sentence is
written four times, with a square beside each repetition of
the sentence. In each repetition, three of the words are
circled. Your task is to decide wich group of circled words

is most closely related to the central meaning of the
sentence. Put a 1 in the square beside the sentence which
has the most important group of words circled. Then pick
the group of words which is next most closely related to the
central meaning of the sentence, and put a 2 in its square,
and so on.

As before, please listen to the sentence at least once
before turning the page.

Your experimenter will stop the tape after the practice
sentence to answer your questions.

--Third Experimental Task--

APPENDIX C
FIRST TASK RESULTS

TABLE   C-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item Ranked	Rank	Active/Back					Active/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb	1	14	45	13	13	11	13	52	9	8	13
	2	36	17	26	18	24	34	15	28	29	33
	3	17	8	20	24	19	14	6	18	18	19
	4	12	9	20	24	25	18	6	24	24	14
Agent	1	55	28	61	31	33	46	23	68	43	29
	2	11	28	6	21	13	9	35	3	11	22
	3	7	13	7	19	18	16	12	3	16	13
	4	6	10	5	8	15	8	9	5	9	15
Direct Object	1	7	6	5	35	9	8	2	2	23	2
	2	24	31	38	27	30	17	12	17	11	10
	3	37	36	27	12	27	22	24	32	26	32
	4	11	6	9	5	13	32	41	28	19	35
Indirect Object	1	3	0	0	0	26	12	2	0	5	35
	2	8	3	9	13	12	19	17	31	28	14
	3	18	22	25	24	15	27	37	26	19	15
	4	50	54	45	42	26	21	23	22	27	15

In the tables throughout the appendix section, when column
or row headings must be abbreviated, the following meanings
are intended:

    Sentence Voice: A = active
                      P = passive

    Dative Position: B = back (indirect object after direct
                            object)
                      F = forward (indirect object in front
                            of direct object)

    Stress Location: N = no contrastive stress
                      V = contrastive stress on verb
                      G = contrastive stress on agent
                      D = contrastive stress on direct
                            object
                      I = contrastive stress on indirect
                            object

TABLE C-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item Ranked	Rank	Passive/Back					Passive/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb	1	18	39	7	7	10	9	47	12	7	10
	2	31	26	22	27	24	27	16	30	31	28
	3	9	8	20	19	28	23	6	22	25	24
	4	21	6	30	26	17	20	10	15	16	17
Agent	1	6	6	27	1	4	6	10	32	6	3
	2	5	5	13	7	9	13	9	9	11	6
	3	22	18	16	35	15	17	14	10	19	19
	4	46	50	23	36	51	43	46	28	43	51
Direct Object	1	52	29	36	66	36	12	4	11	39	5
	2	17	21	23	7	20	32	28	21	19	39
	3	8	13	15	4	18	23	31	26	15	29
	4	2	10	5	2	5	12	16	21	6	6
Indirect Object	1	3	5	9	5	29	52	18	24	27	61
	2	26	21	21	38	26	7	26	19	18	6
	3	40	40	28	21	18	16	28	21	20	7
	4	10	13	21	15	6	4	7	15	14	5

TABLE C-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	89.0**	.37**	P/B/N	86.3**	.36**
A/B/V	97.3**	.40**	P/B/V	79.0**	.32**
A/B/G	96.7**	.40**	P/B/G	31.6**	.12
A/B/D	69.0**	.28*	P/B/D	110.7**	.46**
A/B/I	7.3	.02	P/B/I	70.6**	.29**
A/F/N	35.4**	.14	P/F/N	61.5**	.25*
A/F/V	93.8**	.39**	P/F/V	56.8**	.23*
A/F/G	93.6**	.39**	P/F/G	3.7	.003
A/F/D	26.7**	.10	P/F/D	50.5**	.21
A/F/I	39.6**	.16	P/F/I	100.4**	.42**

* $p<.05$ ** $p<.01$

TABLE C-4

PERCENT DISTRIBUTION OF FIRST RANK

Item Ranked	Active/Back					Active/Forward				
	N	V	G	D	I	N	V	G	D	I
Verb	18	57	16	16	14	16	66	11	10	16
Agent	70	35	77	39	42	58	29	86	54	37
Dir.Obj.	9	8	6	44	11	10	3	3	29	3
Ind.Obj.	4	0	0	0	33	15	3	0	6	44

Item Ranked	Passive/Back					Passive/Forward				
	N	V	G	D	I	N	V	G	D	I
Verb	23	49	9	9	13	11	59	15	9	13
Agent	8	8	34	1	5	8	13	41	8	4
Dir.Obj.	66	37	46	84	46	15	5	14	49	6
Ind.Obj.	4	6	11	6	37	66	23	30	34	77

TABLE C-5

PERCENT ASSIGNMENT OF FIRST RANK ACCORDING TO
POSITION AND STRESS.

Item Ranked	Stress Location				
	Normal	Noun[1]	Verb	Noun[2]	Noun[3]
Noun[1]	65	81	31	39	43
Verb	17	12	58	14	12
Noun[2]	11	5	5	44	11
Noun[3]	7	2	6	4	34

APPENDIX D
FIRST TASK ANOVA RESULTS

TABLE D-1

VERB

Source	SSq	df	MSq	F
Ss	587.83	78	7.54	
Voice (V)	1.58	1	1.58	2.86
Dative Position (DP)	1.71	1	1.71	2.40
Stress (C)	225.71	4	56.43	52.78***
Ss x V	43.21	78	.55	
Ss x DP	55.68	78	.71	
V x DP	.09	1	.09	.16
Ss x C	333.57	312	1.07	
V x C	1.11	4	.28	.58
DP x C	7.11	4	1.78	3.26*
Ss x V x DP	43.52	78	.56	
Ss x V x C	148.58	312	.48	
Ss x DP x C	169.98	312	.54	
V x DP x C	8.48	4	2.12	3.61**
Ss x V x DP x C	183.15	312	.59	

TABLE D-2

AGENT

Source	SSq	df	MSq	F
Ss	427.80	78	5.48	
Voice (V)	672.76	1	672.76	237.50***
Dative Position (DP)	.61	1	.61	.94
Stress (C)	162.41	4	40.60	41.35***
Ss x V	220.95	78	2.83	
Ss x DP	50.54	78	.65	
V x DP	.53	1	.53	.92
Ss x C	306.39	312	.98	
V x C	12.58	4	3.15	4.71**
DP x C	2.17	4	.54	1.05
Ss x V x DP	45.16	78	.58	
Ss x V x C	208.41	312	.67	
Ss x DP x C	160.40	312	.51	
V x DP x C	4.48	4	1.12	2.07
Ss x V x DP x C	169.30	312	.54	

$*$ $p<.05$ $**$ $p<.01$ $***$ $p<.001$
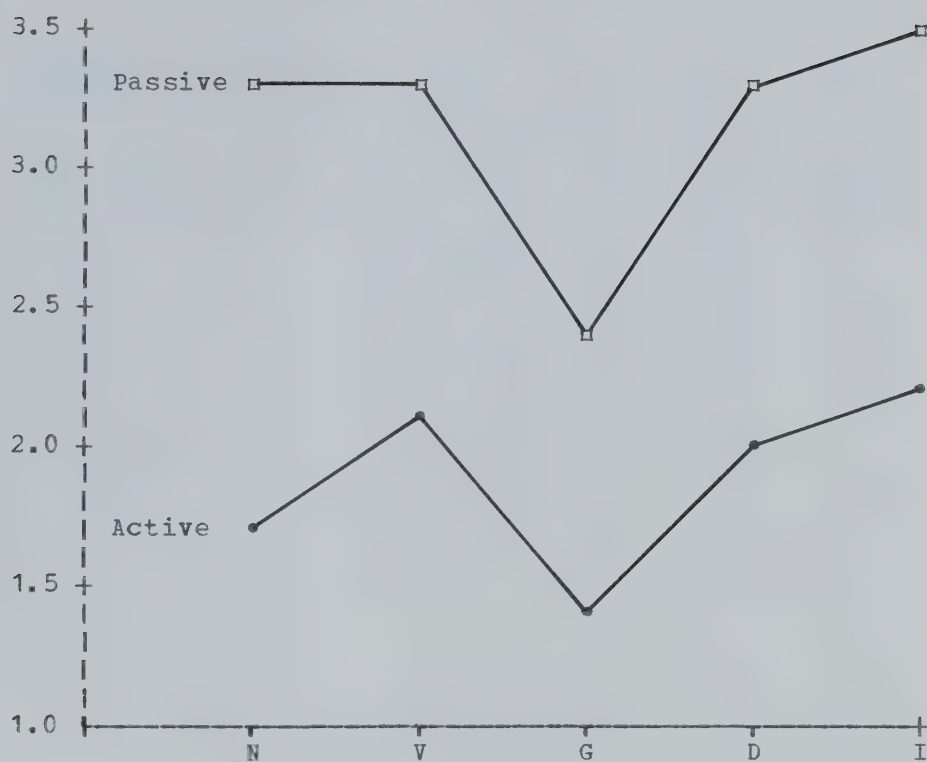
Fig. D-1. Voice by stress effects: Agent.

TABLE D-3

DIRECT OBJECT

Source	SSq	df	MSq	F
Ss	161.89	78	2.08	
Voice (V)	165.91	1	165.91	163.02***
Dative Position (DP)	179.13	1	179.13	252.34***
Stress (C)	124.49	4	31.12	30.19***
Ss x V	79.38	78	1.02	
Ss x DP	55.37	78	.71	
V x DP	1.23	1	1.23	1.32
Ss x C	321.60	312	1.03	
V x C	6.79	4	1.70	3.14*
DP x C	.89	4	.22	.40*
Ss x V x DP	72.67	78	.93	
Ss x V x C	168.88	312	.54	
Ss x DP x C	173.58	312	.56	
V x DP x C	8.72	4	2.18	3.31*
Ss x V x DP x C	205.14	312	.66	

TABLE D-4

INDIRECT OBJECT

Source	SSq	df	MSq	F
Ss	245.87	78	3.15	
Voice (V)	204.91	1	204.91	110.44***
Dative Position (DP)	127.60	1	127.60	166.29***
Stress (C)	168.26	4	42.07	48.64***
Ss x V	144.72	78	1.86	
Ss x DP	59.85	78	.77	
V x DP	.01	1	.01	.01
Ss x C	269.83	312	.86	
V x C	5.38	4	1.34	2.25
DP x C	11.92	4	2.98	5.24***
Ss x V x DP	79.84	78	1.02	
Ss x V x C	186.70	312	.60	
Ss x DP x C	177.35	312	.57	
V x DP x C	4.47	4	1.12	1.98
Ss x V x DP x C	176.18	312	.56	

* p<.05   ** p<.01   *** p<.001
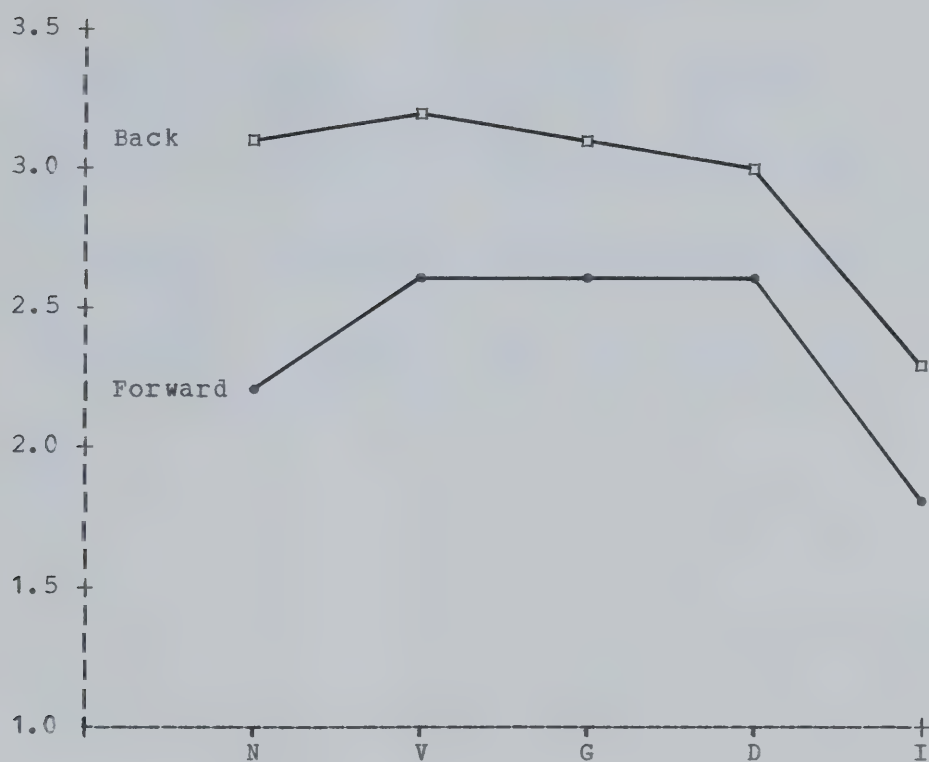
Fig. D-2. Dative position by stress effects: Indirect object.

TABLE D-5

MEAN RANKS: NORMAL AND CONTRASTIVE STRESS

Item Ranked	Stress Location	Active		Passive	
		Back	Fwd.	Back	Fwd.
Agent	Normal	1.54	1.82	3.37	3.23
	Agent	1.44	1.30	2.44	2.43
Direct Object	Normal	2.66	2.99	1.49	2.44
	Dir.Obj.	1.84	2.52	1.27	1.85
Indirect Object	Normal	3.46	2.72	2.72	1.65
	Ind.Obj.	2.52	2.13	2.01	1.44
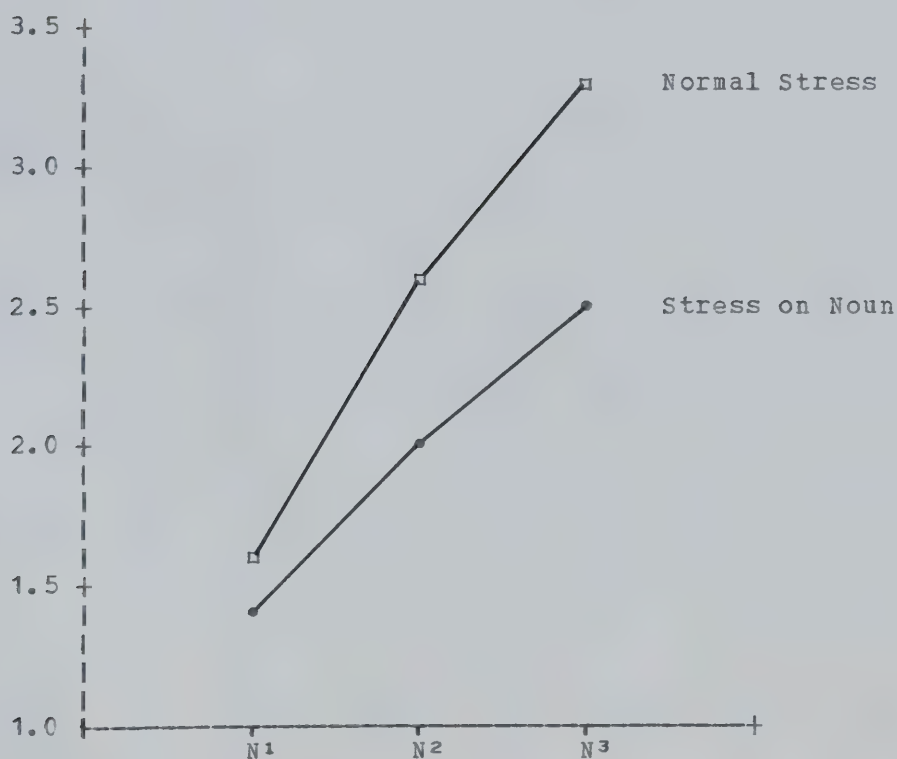
Fig. D-3. Effect on NP's of stress and position.

APPENDIX E
SECOND TASK RESULTS

TABLE   E-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item Ranked	Rank	Active/Back					Active/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb/ Agent	1	38	51	51	27	29	36	51	39	35	38
	2	20	14	15	29	24	17	14	27	19	23
	3	10	6	5	12	11	13	8	4	15	9
	4	6	7	1	6	7	6	1	2	3	3
	5	4	0	4	5	6	4	3	3	4	2
	6	1	1	3	0	2	3	2	4	3	4
Verb/ Direct Object	1	10	15	11	19	15	6	4	3	8	5
	2	22	28	23	22	20	7	9	9	10	9
	3	17	23	16	20	22	13	17	20	15	11
	4	11	7	20	11	11	26	16	17	12	22
	5	5	4	5	3	5	17	27	16	19	22
	6	6	2	4	4	6	10	6	14	15	10
Verb/ Indirect Object	1	2	2	0	1	2	10	15	8	7	17
	2	4	3	7	6	6	32	18	18	29	23
	3	14	11	13	10	11	16	18	17	16	17
	4	19	18	17	21	18	8	19	20	16	11
	5	26	32	25	22	21	8	4	12	7	10
	6	14	13	17	19	21	5	5	4	4	1
Agent/ Direct Object	1	10	4	13	19	8	12	3	8	4	4
	2	16	11	13	11	3	3	9	6	5	6
	3	7	9	11	10	14	10	11	14	9	9
	4	19	26	17	14	22	11	12	15	15	14
	5	17	18	22	21	20	20	24	23	27	23
	6	10	11	3	4	12	23	20	13	19	23
Agent/ Indirect Object	1	5	2	3	2	11	12	6	19	10	12
	2	9	5	7	5	14	14	15	12	7	10
	3	8	8	15	11	7	5	9	8	9	7
	4	5	12	13	6	11	13	12	8	11	12
	5	15	13	5	20	9	15	10	11	12	11
	6	37	39	36	35	27	20	27	21	30	27
Direct Object/ Indirect Object	1	6	5	1	11	14	3	0	2	15	3
	2	8	18	14	6	12	6	14	7	9	8
	3	23	22	19	16	14	22	16	16	15	26
	4	19	9	11	21	10	15	19	17	22	17
	5	12	12	18	8	18	15	11	13	10	11
	6	11	13	16	17	11	18	19	23	8	14

TABLE   E-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item Ranked	Rank	Passive/Back					Passive/Forward				
		N	V	G	D	I	N	V	G	D	I
	1	1	5	5	1	2	4	7	11	4	4
	2	6	6	10	5	3	10	5	2	6	7
Verb/	3	12	11	9	14	8	6	13	9	5	6
Agent	4	17	19	20	23	15	12	16	16	14	13
	5	27	22	21	19	32	23	26	22	26	28
	6	16	16	14	17	19	24	12	19	24	21
	1	50	54	34	49	37	14	22	12	20	11
Verb/	2	12	15	14	14	22	20	27	25	28	22
Direct	3	8	4	18	7	11	24	14	20	18	26
Object	4	6	4	6	4	3	15	10	11	10	14
	5	2	1	2	3	2	5	1	5	1	5
	6	1	1	5	2	4	1	5	6	2	1
	1	8	13	10	9	18	33	41	28	25	46
Verb/	2	33	38	27	37	28	23	16	24	29	13
Indirect	3	16	17	22	13	14	10	9	13	13	7
Object	4	10	6	10	10	10	6	5	5	4	6
	5	6	3	5	7	7	3	5	7	6	3
	6	6	2	5	3	2	4	3	2	2	4
	1	4	0	11	4	4	7	2	12	9	5
Agent/	2	3	2	5	4	5	5	7	10	3	5
Direct	3	13	10	5	12	9	17	20	16	17	19
Object	4	14	7	15	13	20	19	21	14	17	17
	5	24	34	23	28	20	18	15	19	21	14
	6	21	26	20	18	21	13	15	8	12	19
	1	7	2	8	2	8	4	3	8	4	1
Agent/	2	12	8	10	8	6	6	4	8	4	10
Indirect	3	13	22	11	21	14	9	8	11	11	11
Object	4	10	10	5	4	15	13	12	9	9	9
	5	9	7	13	13	4	11	16	10	16	17
	6	28	30	32	31	32	36	36	33	35	31
	1	9	5	11	14	10	17	4	8	17	12
Direct	2	13	10	13	11	15	156	21	10	9	22
Object/	3	17	15	14	12	23	13	15	10	15	10
Indirect	4	22	33	23	25	16	14	15	24	25	20
Object	5	11	12	15	9	14	19	16	16	9	12
	6	7	4	3	8	1	1	8	11	4	3

TABLE E-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	107.6**	.26*	P/B/N	124.4**	.31**
A/B/V	163.7**	.41**	P/B/V	182.2**	.45**
A/B/G	122.6**	.30**	P/B/G	75.4**	.18
A/B/D	120.1**	.30**	P/B/D	133.1**	.33**
A/B/I	72.4**	.17	P/B/I	130.3**	.32**
A/F/N	74.7**	.18	P/F/N	108.9**	.27*
A/F/V	115.0**	.28*	P/F/V	125.1**	.31**
A/F/G	82.0**	.20	P/F/G	68.6**	.16
A/F/D	84.1**	.20	P/F/D	127.8**	.31**
A/F/I	100.4**	.24*	P/F/I	123.6**	.30**

* $p < .05$ ** $p < .01$

TABLE E-4

PERCENT ASSIGNMENT OF FIRST RANK ACCORDING TO
POSITION AND STRESS.

Item Ranked	Stress Location				
	Normal	Noun[1]	Verb	Noun[2]	Noun[3]
Verb-N[1]	50	59	62	40	40
Verb-N[2]	16	12	21	23	14
Verb-N[3]	4	3	6	18	12
N[1]-N[2]	15	18	6	18	12
N[1]-N[3]	8	5	3	4	11
N[2]-N[3]	7	3	3	10	16

APPENDIX F
THIRD TASK RESULTS

TABLE   F-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item Ranked	Rank	Active/Back					Active/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb/	1	41	46	46	40	29	16	24	27	28	10
Agent/	2	8	20	14	23	19	26	29	22	26	18
Direct	3	13	3	9	7	9	17	17	18	13	20
Object	4	10	3	3	2	15	13	2	5	5	24
Verb/	1	7	10	6	9	12	27	34	24	15	34
Agent/	2	29	25	24	11	21	16	11	16	7	13
Indirect	3	18	20	27	15	20	17	15	16	20	19
Object	4	18	17	15	37	19	12	12	16	30	6
Verb/	1	8	12	6	6	15	9	8	6	13	11
Dir.Obj./	2	26	21	21	22	23	24	25	22	26	30
Ind.Obj.	3	19	22	16	30	20	22	24	19	19	17
	4	19	17	29	14	14	17	15	25	14	14
Verb/	1	16	4	14	17	16	20	6	15	16	17
Dir.Obj./	2	9	6	13	16	9	6	7	12	13	11
Ind.Obj.	3	22	27	20	20	23	16	16	19	13	11
	4	25	35	25	19	24	30	43	26	23	28

TABLE F-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item Ranked	Rank	Passive/Back					Passive/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb/	1	5	13	16	8	10	10	16	12	6	4
Agent/	2	25	27	21	18	21	20	20	29	33	20
Direct	3	21	18	23	26	16	20	22	18	19	21
Object	4	21	14	12	20	25	22	14	13	14	27
Verb/	1	5	8	7	3	5	10	12	17	5	14
Agent/	2	15	22	24	19	23	20	25	17	16	17
Indirect	3	26	26	22	18	25	24	21	24	17	26
Object	4	26	16	19	32	19	18	14	14	34	15
Verb/	1	49	45	36	48	47	32	36	31	46	47
Dir.Obj./	2	14	16	9	13	11	20	17	9	14	14
Ind.Obj.	3	6	8	8	9	10	8	10	9	9	4
	4	3	3	19	2	4	12	9	23	3	7
Verb/	1	13	6	13	13	10	20	8	12	15	7
Dir.Obj./	2	18	7	18	22	17	12	10	17	9	21
Ind.Obj.	3	19	20	19	19	21	20	19	21	27	21
	4	22	39	22	18	24	20	35	22	21	23

TABLE F-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	21.9**	.09**	P/B/N	61.5**	.27*
A/B/V	72.5**	.33**	P/B/V	65.3**	.29*
A/B/G	51.2**	.23	P/B/G	9.9*	.03
A/B/D	53.7**	.24*	P/B/D	61.8**	.28*
A/B/I	9.6	.03	P/B/I	47.0**	.21
A/F/N	9.1*	.03	P/F/N	15.3**	.06
A/F/V	51.5**	.23	P/F/V	33.1**	.14
A/F/G	20.8**	.08	P/F/G	3.8	.004
A/F/D	22.7**	.09	P/F/D	55.5**	.25*
A/F/I	19.8**	.08	P/F/I	50.5**	.22

* $p < .05$ ** $p < .01$

APPENDIX G
SECOND TASK ANOVA: SIGNIFICANT INTERACTIONS.
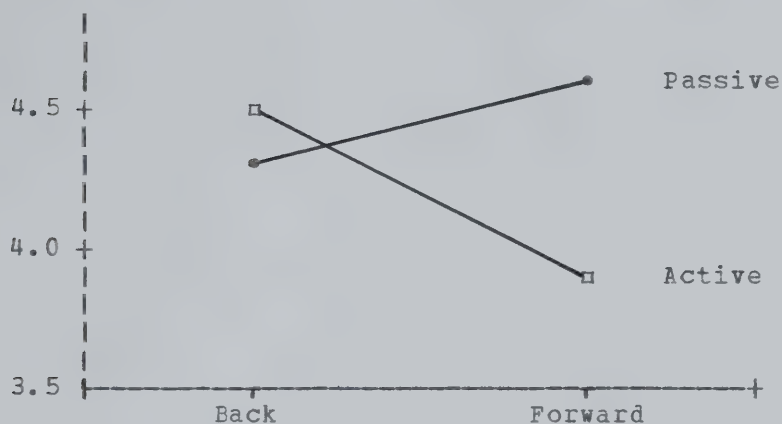

Fig. G-1. Voice by dative position effects:
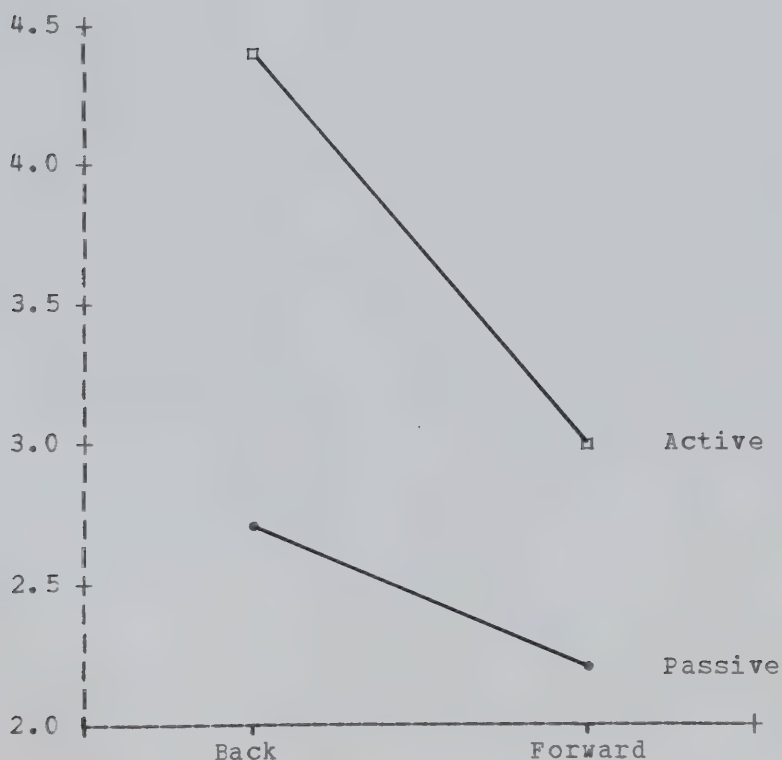Agent - indirect object pair.

Fig. G-2. Voice by dative position effects:
Verb - indirect object pair.